

ADDITIONS TO THE HERPETOLOGICAL FAUNA OF THE
PHILIPPINE ISLANDS, II

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FOUR PLATES

This paper contains descriptions of the following species believed to be new:

AMPHIBIANS

<i>Rana igorota.</i>	<i>Cornufer rivularis.</i>
<i>Rana yakani.</i>	<i>Cornufer montanus.</i>
<i>Rana tafti.</i>	<i>Cornufer subterrestris.</i>
<i>Micrixalus diminutiva.</i>	<i>Polypedates linki.</i>

LIZARDS

<i>Sphenomorphus beyeri.</i>	<i>Tropidophorus stejnegeri.</i>
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SNAKE

Natrix barbouri.

The following species are listed with notes on color and scalation and other pertinent data:

AMPHIBIANS

<i>Oxyglossis lævis</i> Günther.	<i>Polypedates pardalis</i> (Günther).
<i>Rana suluensis</i> Taylor.	<i>Polypedates appendiculatus</i> (Günther).
<i>Rana luzonensis</i> Boulenger.	<i>Kalophrynus stellatus</i> Stejneger.
<i>Rana sanguinea</i> Boettger.	<i>Bufo philippinicus</i> Boulenger.
<i>Rana erythræa</i> (Schlegel).	<i>Megalophrys stejnegeri</i> Taylor.
* <i>Staurois natator</i> (Günther).	
<i>Cornufer corrugatus</i> (Duméril).	

LIZARDS

<i>Lepidodactylus divergens</i> Taylor.	<i>Brachymeles gracilis</i> (Fischer).
<i>Lepidodactylus aureolineatus</i> Taylor.	<i>Brachymeles schadenbergi</i> (Fischer).
<i>Sphenomorphus luzonensis</i> (Boulenger).	<i>Brachymeles vermis</i> Taylor.
	<i>Dibamus argenteus</i> Taylor.

SNAKES

<i>Natrix lineata</i> (Peters).	<i>Zaocys luzonensis</i> Günther.
<i>Natrix dendrophiops</i> (Günther).	<i>Holarchus meyerinkii</i> (Steindachner).
<i>Oxyrhabdium modestum</i> (Duméril and Bibron).	<i>Psammodynastes pulverulentus</i> (Boie).
<i>Oxyrhabdium leporinum</i> (Günther).	

Boiga dendrophila divergens Taylor.
Hemibungarus calligaster (Wiegmann).
Hemibungarus mcclungi Taylor.

Doliophis philippinus (Günther).
Naja naja philippinensis Taylor.
Naja naja samarensis (Peters).
Trimeresurus wagleri wagleri (Boie).

Rana guerreroi Taylor has been relegated to the synonymy of *Rana luzonensis* Boulenger. The species was established on immature specimens but the study of a large series of larvæ, young, half-grown, and adult specimens obtained in 1920 makes this action imperative.

Under *Natrix barbouri* sp. nov., I have endeavored to show that *Natrix crebripunctata* (Wiegmann) should be eliminated from lists of Philippine snakes, since it is beyond question a name based on a young specimen of *Natrix spilogaster* (Boie).

AMPHIBIANS

Oxyglossis lævis Günther.

Oxyglossis lævis GÜNTHER, Cat. Batr. Sal. Brit. Mus. (1858) 6, pl. 1, fig. A; TAYLOR, Amphibians and Turtles of the Philippine Islands (1921) 30.

I obtained specimens in Kalinga and Polillo; on Mount Mari-veles, Mount Banahao, and Mount Maquiling; at Zamboanga; and on Basilan. In each of these localities the species occurred in abundance. I failed to find specimens in Jolo. I have reported specimens from "Sulu Archipelago"¹ but fail to find in my records any mention of collections in Sulu. Usually where the species occurs it is very common and is the first species one picks up. It probably does not occur in Jolo.

Philippine specimens of this species appear to be larger than those from southeastern Asia. Many of my specimens are more than 50 millimeters long from snout to vent. Occasional specimens are more than 60 millimeters long. Published records from extra-Philippine localities give much smaller measurements. The tips of the digits appear to be more widened in Philippine specimens.

Rana suluensis Taylor. Plate 1, fig. 2.

Rana suluensis TAYLOR, Philip. Journ. Sci. 16 (1920) 264; Amphibians and Turtles of the Philippine Islands (1921) 65.

Two specimens of *Rana suluensis* were taken along a small stream in central Jolo, near the Government cattle ranch. The specimens agree very well with the type save in the presence of very distinct dorsolateral folds. Certain young cotypes, how-

¹ Loc. cit.

ever, had narrow folds. As the type has not been figured I include a photograph of one of the Jolo specimens, somewhat enlarged. The type locality is Tawitawi, an island to the southwest of Jolo.

Rana luzonensis Boulenger.

Rana luzonensis BOULENGER, Ann. & Mag. Nat. Hist. VI 17 (1896) 401; TAYLOR, Philip. Journ. Sci. 16 (1920) 254; Amphibians and Turtles of the Philippine Islands (1921) 55.

Rana guerreroi TAYLOR, Philip. Journ. Sci. 16 (1920) 255; Amphibians and Turtles of the Philippine Islands (1921) 56.

A number of specimens which I have referred to *Rana luzonensis* Boulenger were taken at Baguio and at various places along the trail to Bontoc. Larvæ were obtained near the Bontoc-Lepanto boundary from an old Bontoc fisherman, who had a small tin nearly filled with the larvæ. He had taken them for food, from a mountain stream near the trail. Larvæ and newly transformed young were taken at the town of Bontoc in the river and among the stones forming the walls of the rice paddies. A study of this series of larvæ and young and adult specimens has convinced me that my *Rana guerreroi* is the young of *Rana luzonensis*.

Measurements of Rana luzonensis Boulenger.

	No. 662.	No. 713.
	mm.	mm.
Snout to vent.....	58	53
Length of head.....	21	20
Width of head.....	17	14
Diameter of eye.....	6.7	6.5
Eye to end of snout.....	9.5	9
Eye to nostril.....	6	5.3
Upper eyelid.....	5	5
Interorbital space.....	5	5
Forelimb.....	39	34
Longest finger, with hand.....	19	15
Hind limb.....	109	97
Femur.....	32	30
Tibia.....	36.5	32
Longest toe, to metatarsal tubercle.....	32	25

Color in life.—(No. 662.) Above grayish to yellow-brown, with numerous blackish flecks on back; a black loreal streak and a black-brown tympanic spot; a brown spot near insertion of arm on underside; a light yellowish line from under eye to angle of mouth; limbs strongly barred with dark brown; chin and throat uniform purplish, growing brown on belly; soles dark with lighter tubercles; underside of arm cream, without spots.

The specimens vary considerably among themselves in color; one specimen (No. 718) is uniform reddish to red-brown above, posterior part of belly yellow to yellow-green, anterior part of throat and chin cream white.

Two other specimens were somewhat yellow-brown to olive above, with subarticular tubercles cream yellow. In one specimen (No. 664) the black spots are wanting on the side of the head.

The adult specimens were taken in various localities. One specimen was on the trunk of a growing tree concealed in moss, at a distance of about 2 meters from the ground. Three specimens were found in a rotten log lying across a small mountain brook, 14 kilometers north of Baguio near the trail. Young specimens were taken under stones near small brooks and rivers.

Rana igorota sp. nov. Plate 3, fig. 1.

Type.—No. F786, E. H. Taylor collection; collected April 28, 1920, at Balbalan, Kalinga Subprovince, northern Luzon, by E. H. Taylor.

Description of type.—Choanæ moderate, rather hidden by overhanging jaw; vomerine teeth in two series lying between and behind choanæ, separated from latter by a distance equal to length of one series, separated from one another by a distance somewhat less; tongue large with two elongate horns widely separated at base; snout elongate; head much longer than wide; eye a little shorter than snout; nostril nearer end of snout than eye; loreal region nearly perpendicular, strongly concave; tympanum large, separated from eye by a distance less than half the diameter of tympanum; distance between nostrils slightly greater than their distance from eye; interorbital distance equal to or a little less than upper eyelid; skin on head smooth; no tubercles on eyelids; back smooth save in posterior part where there are small scattered tubercles; a very narrow, distinct, tubercular, dorsolateral, glandular fold present; a glandular fold below tympanum turning down at its posterior end and terminating in a tubercle; upper surface of tibia with strong, scattered tubercles; belly granular in posterior part; chin and throat smooth; posterior and inferior aspects of femur largely granular; fingers with very broad disks, equal to two-thirds the diameter of tympanum, on the two outer fingers; disks smaller on the two inner fingers; first finger greatly thickened at base, distinctly shorter than second; subarticular tubercles distinct; palmar and carpal tubercles rather dim; toes with well-

developed, somewhat pointed disks about the size of that on the second finger; toes about four-fifths webbed, the web reaching fourth toe disk by only a very narrow membrane; sub-articular tubercles strong; an elongate outer and a small rounded inner metatarsal tubercle; a narrow skin fold on outer side of fifth toe, and on foot; a mere suggestion of a fold on forelimb; hind limb brought forward, the tibiotarsal articulation reaches about halfway between eye and nostril. The type specimen is a female, without vocal sacs.

Color in life.—Above, body green to olive green variegated with numerous rounded bronze spots; sides yellow-green, spotted with olive; belly yellow; lores dark olive; tympanum brown; limbs strongly barred with green and bronze; pads on toes cream yellow; dorsolateral glandular folds golden yellow.

Measurements of the type of Rana igorota sp. nov.

	mm.
Snout to vent	60
Length of head	22
Width of head	18
Length of snout	10
Diameter of eye	8.2
Upper eyelid	6.5
Interorbital area	5
Tympanum	5.5
Forelimb	38
Longest finger, with hand	17
Hind limb	99
Tibia	30
Femur	32
Longest toe, to metatarsal tubercle	25

Variation.—There is considerable variation in markings. In some specimens the rounded spots on the back are dim or almost wanting; likewise the spots on sides. Some of the younger specimens were nearly yellow in life. The distinctness of the granules on back and femur varies. There are nine cotypes, but I fail to find vocal sacs in any of them. Two or three specimens have minute spinelike tubercles on the lower jaw, throat, and breast, and in the area about tympanum. This may be a sexual variation.

Remarks.—This species is related to *Rana luzonensis* but differs materially in numerous characters. The hind limb is shorter in *R. igorota*, the tibiotarsal articulation reaching no farther than the nostril, while in *R. luzonensis* it reaches far beyond the tip of the snout. The snout of *R. igorota* is less flattened, the interorbital area narrower, and the disks on the toes

are slightly wider than in *R. luzonensis*. The color and markings are strikingly different.

Specimens of this species were collected only at Balbalan, Kalinga, on the edge of a small brook. When disturbed they dived in the brook and hid under rocks at the bottom, where they were captured.

The name of the species is derived from Igorot, the generic name applied to the peoples inhabiting the central part of northern Luzon.

Rana yakani sp. nov. Plate 1, fig. 1; Plate 2, fig. 1.

Type.—No. 1545, E. H. Taylor collection; collected at Abung-abung, Basilan, October 22, 1920, by E. H. Taylor.

Description of type.—Choanæ moderately large, partially concealed by overhanging jaw; vomerine teeth in two small oblique series; separated from choanæ by a distance equal to length of one series, the two series separated by a similar distance; teeth extend much beyond posterior border of choanæ, and do not or scarcely reach anterior border; tongue broad, cordiform, with two rounded horns behind, very narrowly separated at base; a prominent tubercle on tongue, head rather bluntly pointed; snout extending beyond lower lip; canthus rostralis distinct, rounded; loreal region nearly perpendicular, deeply grooved behind nostril; eye large, diameter of orbit very slightly less than its distance from tip of snout; nostril nearer end of snout than eye; interorbital distance a little less than width of upper eyelid; distance between nostrils equals their distance from eye; tympanum large, distinct, equal to about three-fifths orbit; strong, broad, dorsolateral folds from eye to near anus, converging somewhat posteriorly; no supratympanic fold or, if present, indistinct; upper lip glandular; a glandular fold at corner of mouth and another above insertion of arm; skin on back heavily covered with small granules; snout more or less smooth; upper eyelid granular; granules on limbs arranged in dim longitudinal lines; sides with numerous enlarged tubercles; throat and belly smooth; posterior and inferior aspect of femur strongly granular; a deep elongate groove in middle of back between shoulders; fingers slender, elongate, with distinct disks on tips, about one and one-fourth to one and one-half times as wide as finger; subarticular tubercles strong; carpal and palmar tubercles distinct; first finger distinctly longer than second, extending as far as fourth; no gland on arm; toes with disks larger than those on fingers; disks on both fingers and toes rather pointed; toes about two-thirds webbed, the web reaching

to near disk on outer side of third and inner side of fifth, not more than halfway on first toe, and slightly in advance of the penultimate subarticular tubercle on fourth; subarticular tubercles strong; no tubercles on sole; very strong, inner, metatarsal tubercle and a strong outer one which is only very little smaller than the inner; no fold on outer side of fourth toe of foot; the leg brought forward the tibiotarsal articulation reaches anterior corner of eye or a little farther.

Color in life.—Above olive to bronze brown with darker brown spots and mottlings; dorsolateral glandular fold lighter olive bordered below by a black-brown line; loreal region with a broad band of black-brown; tympanum and side of head dark brown with a lighter area behind eye; sides with yellow tubercles, low on side; belly cream to yellow; limbs strongly barred and mottled with brown; web of foot blackish; fold at corner of mouth yellow.

Measurements of Rana yakani sp. nov.

	No. 1545, ♀	No. 1603, ♀	No. 1027, ♂
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>
Length, snout to vent.....	67	65	48
Length of head.....	24	24	20
Width of head.....	21	21	16
Snout.....	10	9.8	8.5
Eye to nostril.....	6.5	5.5	5
Upper eyelid.....	6	6	6
Diameter of eye.....	9.2	9.3	8
Interorbital distance.....	5	5.5	4.5
Tympanum.....	6	6	5.5
Forelimb.....	38	38	30
Longest finger, with hand.....	17	16	13.5
Hind limb.....	104	98	74
Femur.....	31	29	23
Tibia.....	35	34	25
Longest toe, to metatarsal tubercule.....	28	27	21

Variation.—The sexes vary greatly in size. The largest female (No. 1065), from Zamboanga, measures 75 millimeters from snout to vent; the largest male, also from Zamboanga, measures 48 millimeters from snout to vent. There is a certain amount of variation in the size of the eye and the tympanum, and in the distinctness of the granulation on the back. Males are for the most part smoother than females. The groove on the back is invariably present. The tubercle on the tongue is distinct in some specimens and dim or wanting in others. In color, they vary from yellow olive to deep bronze. Males are usually much lighter in color than females. Young females

are usually deeper brown than older specimens, and the sides of the head and body are frequently black. Many specimens have the belly and throat strongly mottled with dusky.

Remarks.—Only two specimens were obtained at Zamboanga along Tumugao River. None were found at Isabela or Port Holland on Basilan, but this species was not uncommon at Abung-abung in the southern part of the island. Females were usually found in the forest at a considerable distance from water. Most of the males were collected in a small forest stream at a point where a tree top had fallen into the water. More than fifty males and but one or two females were captured there.

The species appears to be related to *Rana erythræa* of the Philippines. It differs in markings, in the greater amount of granulation on the back, in having much larger eyes, in the narrower interorbital distance, and in having transverse bars instead of longitudinal lines on the femur and tibia; the outer metatarsal tubercle is very strong. The last character is wanting in the continental and Malayan *Rana erythræa*, but a small tubercle is evident in specimens supposed to be of this species from Negros and Sibuyan. The name for the species is taken from the tribe of people inhabiting the interior of Basilan.

Rana sanguinea Boettger.

Rana sanguinea BOETTGER, Zool. Anz. 16 (1893) 364; TAYLOR, Amphibians and Turtles of the Philippine Islands (1921) 60.

Specimens of this species were obtained in Busuanga, by Gregorio Lopez, of the Bureau of Science. The specimens are not full grown. The body is reddish brown above, and dark on the sides. The characteristic black mark covering the tympanum is well defined. The throat is dusky with an elongate streak under the point of insertion of the arm, and there are two spots on the back part of the throat.

Rana erythræa (Schlegel).

Hyla erythræa SCHLEGEL, Abbild. Amph. (1837) 27, pl. 9, fig. 3.

Rana erythræa TAYLOR, Philip. Journ. Sci. 16 (1920) 249, pl. 1, fig. 2; text fig. 1; Amphibians and Turtles of the Philippine Islands (1921) 50, pl. 1, fig. 2; text fig. 1.

Specimens of *Rana erythræa* were recently collected on Sibuyan Island. I have also specimens collected in Negros. British Museum specimens from the Philippines bear only the label "Philippines." Fischer,² records a specimen from southern Mindanao collected by Doctor Schadenberg in 1881. No other col-

² Jahrb. wiss. Anst. Hamburg 2 (1885) 80.

lector has found the species in Mindanao. It would appear that this frog is of very erratic distribution in the Islands. Philippine specimens differ from the ordinary Malayan and continental forms in having a small but distinct outer metatarsal tubercle, a character which alone does not appear to warrant separating the Philippine form under a new name.

Rana tafti sp. nov.

Type.—No. 1849, E. H. Taylor collection; collected in mountains near the Pacific coast of Luzon on the trail between Famy, Laguna Province, and Infanta, Tayabas Province, by Lyman H. Taft and F. X Williams.

Description of type.—Choanæ moderate, partly concealed by overhanging jaw, the distance between them equal to distance from eye to nostril; vomerine teeth in two small, rather rounded, nearly transverse series lying between the choanæ, separated from choanæ and from each other by an equal distance; tongue with two prominent horns posteriorly, widely separated at base; no papilla on tongue; no vocal sacs (probably a female specimen); head much flattened, nostril much nearer point of snout than eye; diameter of orbit equal to distance from nostril; eyes prominent, the upper eyelid slightly less than interorbital distance; distance between nostrils about equal to interorbital distance; tympanum very distinct, very large, longer than high, its length equal to diameter of orbit, separated from orbit by a distance less than one-fourth its length; loreal region perpendicular; a groove behind nostril; canthus rostralis sharply angular; snout rather conical in front of nostrils; skin of head and body smooth or very faintly shagreened; posterior part of eyelid slightly granulate; two strong callous tubercles on head lying on upper, inner edge of eyelid near anterior part, and a small tubercle lying nearly between these; two low callous places in interorbital space; a very strong fold above tympanum which continues the length of the body as a very narrow dorsolateral fold; a very slight fold behind tympanum to arm; a broken glandular fold from angle of mouth to arm, very distinct; sides, breast, and throat smooth; posterior part of belly granular; undersurface of femur and anal region granular; fingers with well-developed disks, rather pointed anteriorly; first finger shorter than second; fourth reaches base of pad on third; no fold on arm; no web at base of fingers; subarticular tubercles very strong, protruding; toes about four-fifths webbed, the membrane failing to reach disks on inner side of second and

third toes, but reaching somewhat beyond penultimate subarticular tubercle on fourth; carpal tubercles prominent; subarticular tubercles on toes very strong; a very small metatarsal tubercle and a still smaller outer tubercle; third and fifth toes nearly equal; disks on toes pointed, much smaller than those on fingers; a slight skin fold on outer side of fifth toe, not continued on foot; no tubercle on heel; tibiotarsal articulation reaches considerably beyond tip of snout.

Color in alcohol.—Above blackish purple, nearly uniform; callous spots on head brown; tympanum brown; latter part of upper jaw whitish; an indistinct light spot under eye and in front of tympanum; arms and legs brownish, barred with darker color; underside of femur and tibia spotted brown; a spot on underside of arm near insertion; throat and belly light; purplish spots low on sides.

Measurements of the type of Rana tafti sp. nov.

	mm.
Snout to vent	42
Length of head	18
Width of head	11.5
Diameter of tympanum	5
Diameter of eye	5
Upper eyelid	4
Interorbital distance	4
Eye to nostril	5
Length of snout	7
Depth of head in front of eyes	3.5
Depth of head at tympanum	4.3
Forelimb	27
Longest finger, to wrist	15
Hind limb	73
Femur	22.5
Tibia	24
Longest toe	21

Remarks.—The species is most closely related to *Rana mearnsi* Stejneger from Mindanao, from which it differs in having a longer, narrower, more-flattened head, a larger tympanum of different shape, and smaller toe disks. In the shape of the tympanum it is similar to *Rana merrilli* Taylor but lacks the folds below the anus and differs in measurements. The head is more pointed, and the head and body appear flatter.

When I first examined this specimen I suspected that it was the very rare *Polypedates hecticus*. There is no distinct notch in front of the pad as is present in Philippine species, and dissection of the fourth finger failed to reveal any intercalated bone.

The species was discovered by Mr. Lyman H. Taft and Dr. F. X. Williams, and is named for the former in recognition of his kindness in collecting and presenting to me this and numerous other valuable specimens.

Micrixalus diminutiva sp. nov. Plate 1, figs. 3 and 4; Plate 2, figs. 2 and 3.

Type.—No. 1066, E. H. Taylor collection; collected near Pasananka, Zamboanga, Mindanao, November 10, 1920, by E. H. Taylor.

Description of type.—Choanæ small, widely separated, concealed under overhanging jaw; no vomerine teeth present; tongue very small, without tubercular papilla on tip, very slightly notched behind; apex of lower jaw with a single, toothlike prominence; head short, snout blunt, nostril about midway between eye and tip of snout; eye large, the diameter of orbit distinctly longer than snout; loreal region nearly perpendicular or slightly sloping; canthus rostralis rather indistinct, rounded; a very shallow depression behind nostril; tympanum with only a slight edge visible; a fold from eye running in a straight line to behind angle of mouth, then curving up to above insertion of arm; a glandular area behind angle of mouth; upper eyelid about one and one-fifth times interorbital space; skin above smooth, very minutely shagreened or corrugated; eyelid with a distinct tubercle; a dorsolateral glandular fold begins behind eye and continues more than half the length of body, more prominent anteriorly; this fold is widely separated from the supratympanic fold at its beginning; sides with numerous pustular tubercles, one above arm most prominent; belly and underside of limbs smooth; arms short, fingers small, the tips not or very slightly dilated; the palm very thick; subarticular tubercles nearest palm well defined, outer ones less strongly defined; first finger as long as second and fourth; carpal tubercles flat, indistinct; no web between fingers; indistinct tubercles on outer side of arm; toes about two-thirds webbed, the membrane reaching disk of first and second toes on the outer side and to near disk on the inner edge of fifth; a strong inner metatarsal tubercle; outer very dim, situated at the end of a flap of skin which is on the outer side of fifth toe; a slight fold on heel behind inner metatarsal tubercle; the leg brought forward tibiotarsal articulation reaches to between eye and tip of snout. (Males with two internal vocal sacs, the openings small.)

Color in life.—Above a broad chestnut brown stripe from tip of snout to anus, widening posteriorly; the rest of back and sides

pinkish lavender; two chestnut brown stripes corresponding to the dorsolateral glandular folds extend from eye to shoulder; limbs barred with chestnut brown; brown spots partially separated by yellowish spots on side of head; a yellowish streak from eye to angle of jaw; dark marking low on sides and on groins; belly flesh-colored; chin and throat with scattered brown spots; undersurface of hands and feet purplish.

Measurements of the type of Micrixalus diminutiva sp. nov.

	mm.
Snout to vent	21
Length of head	8
Width of head at tympanum	8
Length of snout	2.6
Diameter of eye	3.4
Upper lid	1.8
Interorbital space	2.2
Forelimb	12
Longest finger, to wrist	6
Hind limb	39
Tibia	11
Femur	11
Longest toe, to metatarsal tubercle	12

Variation.—Several cotypes from the same immediate locality agree with the type in general contour but some have the color pattern much less distinct; in certain specimens the broad dorsal stripe forms three branches posteriorly, one branch ending at the anus, the others being carried across the groin to the femur and tibia. In one specimen, the broad stripe is shaped like an hourglass. A single specimen taken near Abung-abung, Basilan, agrees very well, save that there is a median yellow hair line from snout to anus.

Some twenty specimens collected on Jolo Island differ markedly from the Zamboanga forms. The bodies are for the most part slenderer, the throats are very dark purple (some almost uniform) to halfway on belly. The web is more deeply excised between the toes, particularly between the fourth and fifth which are less than half webbed. The color patterns on the Jolo specimens vary considerably; at least one-fourth have the median hair line yellow in color; some specimens are brownish above, some gray to lavender. The characteristic marking of the type is present in some of the female specimens.

At first I was inclined to regard the Jolo specimens as a distinct species, but as the only tangible difference that held throughout the series was the lesser amount of webbing between the outer toes, I placed both groups under the same name.

Remarks.—This is the first record of this genus for the Philippines. I have no doubt that it is rightly associated with this group, in spite of the fact that it has not been reported from the Malay Peninsula nor from the Archipelago. When I first collected the specimens I thought them probably a new species of *Oxyglossis*. The slightly bifid tongue, the character of the toes, and the presence of the single toothlike prominence at the apex of the lower jaw preclude the possibility of this association.

Annandale³ describes a small frog, *Micrixalus borealis*. He mentions the presence of "a jaw," which is characteristic of this species. The dorsolateral glandular fold, which is characteristic of most Indian species as well as of the species here described, is wanting in his species.

Staurois natator (Günther).

Ixalus natator GÜNTHER, Cat. Batr. Sal. Brit. Mus. (1858) 15, pl. 4, fig. c.

Staurois natator TAYLOR, Amphibians and Turtles of the Philippine Islands (1921) 78.

I collected many specimens of this species at Zamboanga and on Basilan, but found none in Jolo. Gregorio Lopez collected specimens at Cabalian, Leyte.

The Leyte specimens vary markedly in color from the others. Several of the specimens are uniform olive above; in others the color above is blackish with well-defined silver white spots. Seven among eighteen specimens have a distinct tubercle on the tongue.

The Zamboanga and the Basilan specimens are bronze to olive green, usually mottled above with silvery gray to green. The tubercle on the tongue is present in about two-thirds of the specimens, and dim or wanting in the others. The granulation on the back varies considerably. Some specimens are nearly smooth; others strongly granular, with occasional larger tubercles.

Cornufer corrugatus (Duméril).

Hylodes corrugatus DUMÉRIL, Ann. Sci. Nat. III 19 (1853) 176.

Cornufer corrugatus TAYLOR, Amphibians and Turtles of the Philippine Islands (1921) 115.

Platymantis corrugata BOULENGER, Ann. & Mag. Nat. Hist. IX 1 (1918) 373.

I collected this species on Polillo and on Mount Maquiling, Laguna Province, Luzon. I failed to obtain it in any other

³ Rec. Ind. Mus. 8¹ (1912) 10 (8 of author's separate), pl. 2, fig. 2.

place. It has a wide distribution in the islands southeast of the Philippines. It probably occurs in all of the larger islands of the eastern Philippine group, since specimens have been taken in Mindanao, Negros, Luzon, and Polillo. It is very probably absent from the Sulu and the Palawan groups. The specimens vary greatly in color and markings. The regular folds on the back and the dark lores make the form easily recognizable.

Cornufer rivularis sp. nov. Plate 4, fig. 3.

Type.—No. 761, E. H. Taylor collection; collected April 25, 1920, at Balbalan, Kalinga Subprovince, northern Luzon, by E. H. Taylor.

Description of type.—(Adult female.) Choanæ rather large, widely separated; vomerine teeth in two oblique, converging series lying between and almost wholly behind choanæ, separated from the latter by a distance equal to half the length of one series and separated medially by a distance as great as the length of one series; tongue moderately wide with two small rounded horns behind and an indistinct tubercle on anterior part; head about as long as broad; canthus rostralis distinct; top of head strongly curved, longitudinally, to tip of snout; eye moderate, the diameter of orbit equal to or slightly greater than distance from eye to nostril; interorbital space at least one and one-half times the width of upper eyelid; tympanum small, indistinct, apparently covered with skin, its diameter equal to about one-third to one-half the diameter of orbit; a distinct supratympanic fold curves from eye to above insertion of arm; a slight fold curves upward across angle of mouth; head, upper eyelid, and skin on back and sides smooth with no trace of granules or tubercles; throat and chin smooth; posterior part of belly with large mosaiclike granules; area about anus granular; fingers with tips dilated into large disks, much larger than tympanum; disks on two outer fingers much larger than those on inner fingers, which appear to be opposed to the two outer; first very much smaller than second; subarticular tubercles large, distinct; three distinct carpal tubercles; tips of toes widened into distinct disks, smaller than those on outer fingers; a small but distinct web at base of toes; third and fifth toes of equal length, or the third slightly longer; inner metatarsal tubercle elongate, low, dim; outer small, rounded; subarticular tubercles moderately distinct; none or only a dim fold on outer side of fifth toe, a distinct spinelike tubercle on heel; the leg

brought forward the tibiotarsal articulation reaches to near nostril.

Color in life.—Dorsal surface, from extreme tip of snout to anus, light gray; small, scattered, deep black dots and blotches on back, with a large prominent blotch on shoulders; gray area of back edged with blackish laterally; loreal region and sides of head and body dusky; belly and throat whitish, with brown flecks on belly; groin, thighs, femur, hand, and foot yellow; upper lip with a few indistinct yellowish marks.

Measurements of the type of Cornufer rivularis sp. nov.

	mm.
Length, snout to vent	26
Width of head	10
Length of head	11.5
Length of snout	5
Diameter of orbit	3.6
Interorbital distance	3.4
Upper eyelid	2
Tympanum	1.4
Forelimb	19
Longest finger, with hand	9
Hind limb	43
Femur	13
Tibia	14
Longest toe, to metatarsal tubercle	13

Variation.—Five other specimens were taken, all more or less resembling the type in markings and color. One specimen (No. 759) had a large red blotch on the groin. When preserved the markings of most of the specimens changed. The gray area on the back disappeared, and the entire body assumed a brownish color, with two longitudinal dark markings running parallel on the back from occiput to middle of back and two short longitudinal marks on sides ending near the groin. The tubercle on the tongue is more or less distinct in all the specimens.

One of the specimens (No. 760, length 23 millimeters) is full of eggs. These are yellow and are very large, measuring from 3 to 3.5 millimeters in diameter.

The males have vocal sacs; the opening is situated near the angle of the jaws.

Remarks.—The specimens were taken in the small brook, just behind the town of Balbalan, which furnishes water to the town. They were seated on the leaves of a plant growing over the running water. Instead of jumping when I approached, they merely crouched close to the edges of the leaves in which posi-

tion they were picked up. *Cornufer cornutus* was taken in this same shrub.

The species belongs to the section of the genus characterized by the flattened fingers dilated into disks at the tips. I state above that the first and second fingers appear to oppose the other two. This is true in three of the specimens, but in the others the apparent apposition is not so plainly marked. It does not appear to be closely related to other Philippine species.

Cornufer montanus sp. nov. Plate 4, fig. 4.

Type.—No. 861, E. H. Taylor collection; collected May 31, 1920, at an elevation of about 1,500 meters on Mount Banahao, Laguna Province, Luzon, by E. H. Taylor.

Description of type.—Choanæ moderate, not concealed by overhanging jaw; two small groups of vomerine teeth lying between and behind choanæ, beginning near inner posterior edge of choanæ and converging backward, widely separated medially; distance between choanæ greater than distance between nostrils; canthus rostralis distinct; upper part of loreal region perpendicular, then sloping very obliquely to lip; tip of snout rather truncate, sloping obliquely to lip and not extending beyond lower jaw; nostril nearer tip of snout than eye; diameter of orbit equal to length of snout; upper eyelid equal to or slightly wider than interorbital area; tympanum covered with skin, dim, small, a little more than one-third the diameter of orbit, separated from orbit by a distance equal to more than half its diameter; upper eyelid with two large flattened tubercles; a pair of tubercles on back of head, and another pair on shoulders; skin on back and limbs smooth; loreal region slightly granular; a supratympanic fold begins behind eye and curves downward over upper edge of tympanum to insertion of arm; another slight fold curving up across angle of mouth, crossing lower part of tympanum; a strong tubercle on heel; chin, throat, and belly strongly granular; anal region with strong granules; no dorsolateral glandular folds; hand with three outer fingers flattened, the tips dilated into strong disks at least twice as wide as finger; subarticular tubercles strongly defined, large, rounded, and flattened; small palmar tubercles, three carpal tubercles moderately distinct, with a fourth somewhat behind these on wrist; inner finger small, not dilated at tip, and less flattened than the others; toes flattened and dilated at tips, the disks not more than one and one-half times the width of digit; subarticular tubercles large, flat, not strongly defined; a slight rudiment of web be-

tween toes, third toe longer than fifth; an inner and an outer metatarsal tubercle; no skin fold along outer toe to heel; the hind limb brought forward the tibiotarsal articulation reaches to near anterior corner of eye; opening of vocal sac near angle of mouth; tongue with two horns posteriorly and a large tubercle anteriorly.

Color in life.—Above gray-brown, variegated, with a broad median cream yellow stripe from tip of snout to anus; bars on legs dull cream to white; side and groin with large, bright, lemon yellow spots, separated by narrow lines of brown; belly and chin flesh-colored, mottled with brown; underside of limbs with large islandlike white or yellow spots; toes barred with cream; a narrow indistinct line from eye across tympanum and angle of mouth. Loreal region dark brown, mottled slightly with lighter.

Measurements of the type of Cornufer montanus sp. nov.

	mm.
Snout to vent	28.5
Length of head	12
Width of head	11.5
Upper eyelid	3
Interorbital distance	3
Eye to end of snout	5
Diameter of eye	5
Eye to nostril	4
Forelimb	18.5
Longest finger, with hand	10
Hind limb	45
Femur	12.5
Tibia	15
Longest toe, to metatarsal tubercle	12.5

Remarks.—The type was collected at an elevation of nearly 1,500 meters, on Mount Banahao, on small shrubs growing out from a perpendicular cliff. Only the type was found. This species appears to be related to *Cornufer worcesteri* and *C. guentheri*. From the former it differs in having a papilla on the tongue, the eye being larger in proportion to the length of the snout, the upper eyelid equaling the interorbital distance, the tympanum being one-third the diameter of eye, and the tibiotarsal articulation reaching only to the eye instead of to the nostril. The color and markings are essentially different. From *C. guentheri* it differs in color, in the presence of a large tubercle on the heel, and in the absence of one on the angle of the jaws. There are numerous other differences.

Cornufer subterrestris sp. nov.

Type.—No. 707, E. H. Taylor collection; collected near kilometer 101, on the Mountain Trail, Mountain Province, Luzon, April 17, 1920, by E. H. Taylor.

Description of type.—Male. Choanæ small, very far forward and near to each other, not concealed by overhanging jaw; vomerine teeth very dim, represented by a rugose area somewhat between and behind choanæ; tongue elongate, with two posterior horns, which are very narrowly separated at base, and a tubercle on the anterior part; openings to vocal sacs elongate slits near angle of jaws; top of head rather curving forward; canthus rostralis distinct; upper part of loreal region slightly oblique, lower part strongly oblique; nostrils about halfway between orbit and extreme point of snout; eye large, diameter of orbit equal to or very slightly less than length of snout; interorbital area nearly double upper eyelid; distance between nostrils much less than interorbital distance; tympanum moderately distinct, about two-fifths diameter of orbit; skin of head smooth; no tubercle on eyelid; apparently no supratympanic fold; skin on back and sides smooth (in the middle of the back the skin is puckered and drawn forming a small blind sac; this appears to be a normal condition); skin of chin and throat smooth, that on belly very indistinctly granular; area about anus very dimly granular; fingers somewhat flattened, the tips dilated into disks, those of the two outer fingers larger than those of the two inner; subarticular and carpal tubercles rather indistinct; toes slightly flattened, with very small disks; a slight web at base of toes; third toe longer than fifth; subarticular tubercles rather dim; inner metatarsal tubercle present; outer, if present, very dim.

Color in life.—Above purplish without markings on head; sides dark purplish brown with large rounding spots of cream to yellow, more prominent on groin and axilla; upper part of limbs purplish; on sides and below with large, cream-yellow, irregular spots; throat dusky; belly dusky, reticulated with cream.

Measurements of the type of Cornufer subterrestris sp. nov.

	mm.
Snout to vent	25
Length of head	11
Width of head	10.5
Snout	4.8
Diameter of orbit	4.8
Interorbital distance	4
Upper eyelid	2
Tympanum	1.9

Measurements of the type of *Cornufer subterrestris* sp. nov.—Continued.

	mm.
Forelimb	16
Longest finger, with hand	8
Hind limb	38
Tibia	11
Femur	12
Longest toe, to metatarsal tubercle	12

Remarks.—The type specimen has been injured by rubbing, after having been preserved, and there is some doubt as to the correctness of certain minor characters. However, the species is very distinct, and I have no hesitancy in describing it from a single specimen.

After a very heavy rain and hail storm I heard the frogs in the small gullies along the mountain trail. I endeavored to locate them by following up their thin, high-pitched voices. Although the frogs were very close to me, I could not find them. Later in the afternoon several were heard on the bank of a small mountain stream which crosses the trail near kilometer 101. The bank was covered with moss. I stood in the icy water and began to dig in the bank; after half an hour's work, realizing that I must reach camp before dark, I gave up. On starting to pick up my gun, which I had laid on a narrow ledge, I found the tiny frog sitting on my gun stock.

The species apparently belongs in the genus *Cornufer*, although I do not feel wholly certain. More material may warrant a different generic designation. The vomerine teeth are different from those of other species of *Cornufer*—in fact, I am not certain that the slightly rugose area should really be regarded as vomerine teeth.

Polypedates pardalis (Günther).

Rhacophorus pardalis GÜNTHER, Cat. Batr. Sal. Brit. Mus. (1858) 83.

Polypedates pardalis TAYLOR, Philip. Journ. Sci. 16 (1920) 281, pl.

4, fig. 1; pl. 6, figs. 2 and 2a; Amphibians and Turtles of the

Philippine Islands (1921) 82, pl. 4, fig. 1; pl. 6, figs. 2 and 2a.

Specimens of this species were collected at Balbalan, Kalinga, northern Luzon; on Polillo Island; and at Port Holland, Basilan. Four Kalinga specimens were collected at night on April 28, from rain pools in which they were breeding. *Kaloula rigida* Taylor and *Polypedates leucomystax* (Gravenhorst) were breeding in the same pools.

When first taken, the specimens were nearly uniform yellow. Later the live specimens became reddish brown, with markings more or less distinct. The bellies were white to cream, rather than yellow. Three specimens taken in Polillo in July, 1920,

were found in the unfolding leaves of *banban* plants, at a distance of about 2 meters from the ground; two were vivid greenish yellow above and white below, and the third was bluish green, later changing to yellow. The latter when placed in alcohol became bluish, and when fixed is a dark grayish blue. At first I believed I was dealing with a new species. More material may warrant a separation.

Basilan specimens were taken at night on October 10, 1920, in an old open well where they were breeding. Both males and females were dark brown with yellow or cream spots when taken. Masses of eggs were found around the edge of the well, and on plants about the walls. The eggs are laid in masses of foam, very similar to those of *Polypedates leucomystax*. They can be easily distinguished from that species by the fact that the mass is distinctly yellow, while that of *P. leucomystax* is whitish or cream. A number of larvæ and recently transformed young were taken some time later. One of the Polillo adult specimens has a curious deformity. The fourth toe sends off two branches at the antepenultimate joint, resulting in a total of seven fingers. The accessory fingers have developed distinct disks at the tips. The subarticular tubercle of the antepenultimate joint is at one side, wholly on the web.

Polypedates linki sp. nov. Plate 3, fig. 2.

Type.—No 1703, E. H. Taylor collection; collected at Jolo, Jolo Island, November 10, 1920, by E. H. Taylor.

Description of type.—(Adult female.) Choanæ large, not or but slightly concealed by overhanging jaw; vomerine teeth in two short slender oblique series arising from near the upper anterior edge of choanæ and not extending to posterior border; the series of teeth separated by a distance nearly equal to length of one series; tongue rather small, with two posterior horns, no tubercle; snout short, rather truncate; loreal region slightly oblique, concave; canthus rostralis distinct, the edge somewhat rounded; eyes moderate, diameter of orbit equal to distance from nostril; upper eyelid equal to or slightly wider than interorbital distance; distance between nostrils less than their distance from eye and less than interorbital distance; nostril very much nearer to end of snout than eye; tympanum large, entirely distinct, its diameter about two-thirds that of orbit; a well-developed straight glandular fold from behind eye running diagonally to a point some distance behind insertion of arm; interorbital area with a broad shallow depressed area; skin of back almost wholly smooth; skin on head smooth, not involved in cranial ossifica-

tion; edges of frontoparietal bones bordering orbit slightly raised, forming an indistinct narrow crest, converging rather strongly behind; a very faint suggestion of granulation evident on eyelid, on posterior part of body, and on femur; throat smooth or minutely granular; belly and inferior and posterior aspects of femur strongly granulate; three or four granules below anus very slightly larger than others; fingers with strongly dilated tips; subarticular tubercles strong; palmar and carpal tubercles dim, irregular; only small trace of web between fingers; a slight indistinct fold on outer side of arm; tips of toes dilated into disks only a little smaller than disks on fingers; toes webbed to disks on outer side of third and inner side of fifth; web reaches penultimate subarticular tubercle on fourth; first finger about half webbed; subarticular tubercles small, but well differentiated; a well-defined inner metatarsal tubercle; outer, if present, very dim and indistinguishable; a very dim fold on outer side of fifth toe to heel; sole with fine granulation; tibio-tarsal articulation reaches between eye and nostril.

Color in life.—Cream to lemon yellow above, with no traces of markings save a whitish area below eye in front of tympanum; underside cream. (Taken at night.) When preserved in formalin a few bars on the hind limb and a few dusky markings on the throat became visible; the body color became light gray to gray-brown.

Measurements of Polypedates linki sp. nov.

	No. 1703, type, ♀.	No. 1703A, ♂.
	mm.	mm.
Snout to vent	63	43
Length of head	23	17
Width of head	22	15
Snout	11	7.5
Diameter of eye	7	6
Upper eyelid	7	5.5
Interorbital space	6.5	5
Eye to nostril	7	5
Diameter of tympanum	5	3.8
Forelimb	39	29
Longest finger, with hand	19	14
Hind limb	100	72
Femur	35	22
Tibia	36	23
Longest toe, to metatarsal tubercle	23	18

Variation.—The type was collected while it was hopping in the streets of Jolo at night. Five specimens were taken in a small rain pool near the foot of Bud Daho, a low volcanic

crater 10 kilometers east of Jolo. These were sitting in the edge of the grass about the pool and immediately took refuge in the water. The five specimens are all males. (No females were seen in this locality.) These were gray white or cream yellow above. One specimen showed a triangular black mark in the interorbital region and a regular marking on the back. In formalin all show dim markings on limbs, and three have dim triangular markings on the head; there is only a faint suggestion of the white spot in front of the tympanum. No. 1704, taken a few kilometers south of Jolo, near Indanan, was found under the loosened bark of a tree. In life the specimen was brownish yellow, and the mark in front of the tympanum was strongly defined; there was a dim line along the upper lip with dim bronze markings on sides and throat. There is some variation in the relative size of the eye and the length of the snout. The males have no vocal sacs.

One of the specimens taken near Bud Daho was heavily infested with small yellow flukes, which were embedded in the muscles of the limbs and the head. More than fifty specimens of the fluke were taken; they measure, when preserved, 5 to 6 millimeters in length. Two more specimens of *Polypedates linki*, a young and an adult, were recently received from Jolo, collected by Capt. Francis Link.

The species is related to *Polypedates leucomystax* and *P. macrotis*, from which it differs in having a shorter hind limb and a narrower interorbital space, in color and markings, and in the fact that the skin on the head is not involved in the cranial ossification. It may also be related to *P. hecticus*, which is known from Samar, from which it differs in the absence of a strongly defined dorsolateral fold.

The type contains yellow eggs, 3 to 4 millimeters in diameter. The stomach contained a full-grown specimen of *Hemidactylus frenatus*.

Remarks.—The species is named for Capt. Francis Link, Philippine Constabulary, who accompanied me on numerous collecting trips about the island, and assisted greatly in making collections.

Polypedates appendiculatus (Günther).

Rhacophorus appendiculatus GÜNTHER, Cat. Batr. Sal. Brit. Mus. (1858) 79.

Polypedates appendiculatus TAYLOR, Philip. Journ. Sci. 16 (1920) 280, Pl. 8, figs. 2, 2a, and 2b.

Specimens of this species of *Polypedates* were collected on Polillo Island and on Basilan Island. These two localities, particularly the former, extend the known range of the species greatly. Dinagat has hitherto been the most northern locality for the eastern Philippines. The species has been reported from Borneo, Mentawai Islands, and Celebes, outside of the Philippines. The occurrence of the species in the Calamian Islands has been reported by Boettger. I rather question this locality. It will be remembered that there was some doubt regarding the type locality of *Kalophrynus acutirostris* Boettger which is reported as being "entweder von Culion oder von Samar;" it is not improbable that the record for *Polypedates appendiculatus* should be Samar, since no other collector has obtained it either in the Calamian Islands or in Palawan.

The Polillo specimen (No. 877) was captured by myself on July 18, 2 kilometers east of the town of Polillo, in the half-opened leaf of a plant known locally as banban. When taken the specimen was pure canary to lemon yellow above and cream below; no markings of any sort were in evidence. When preserved it became very light lavender above with no markings. The skin is entirely smooth. The folds on the arm and foot are very distinct as are the folds below the anus.

On Basilan the specimens of this species were usually collected at night or during showers. They were for the most part marked or strongly colored. One specimen (No. 1368) taken at Port Holland had the following markings: Above gray, with regular distinct markings on head, shoulders, and back; pupil of eye deep blue, iris copper; throat and belly cream to yellow; anterior and posterior sides of hind limbs bright orange to vermilion. Another specimen (No. 1411) was dull olive brown above; chin greenish yellow; belly flesh-colored; anal region white; sides of femur vermilion.

The vermilion marking was evident in all of the Basilan specimens. The red markings of the femur persisted long after the specimens were preserved. Some show spots of black, but most of the specimens are dull mottled lavender when preserved. Some have granules or tubercles on the back; in others the skin is smooth. None of the specimens has extensive webbing on the foot as is shown in Boulenger's figure.⁴

Most of the specimens were discovered by hearing their call at night. All seem to be males.

⁴ Cat. Batr. Sal. Brit. Mus. ed. 2 (1882) 86, pl. 8, fig. 4.

Kalophrynus stellatus Stejneger.

Kalophrynus stellatus STEJNEGER, Proc. U. S. Nat. Mus. 33 (1908) 575; TAYLOR, Philip. Journ. Sci. 16 (1920) 329, pl. 9, fig. 2; Amphibians and Turtles of the Philippine Islands (1921) 130.

I obtained a splendid series of this species at Port Holland, Basilan, between October 8 and 14. The animals were found breeding in an old watering trough near the forest, and in pools of stagnant water held by gnarled tree roots in the same immediate locality.

A large female with a male clasped on her back was first discovered hopping toward the trough about 11 o'clock in the morning of October 8. I watched them enter the water and begin swimming about. The male kept holding on to the female with his arms, leaving his legs stretched out behind. After about five minutes the female ducked her head and anterior part of the body under the water, exposing the posterior part, and the anal opening. The male slid back until his head was out of the water, and clasping the female along the side of the belly placed his legs in such a position about the anus that a small cup was formed, into which the female extruded a small group of eggs, and the male, the sperm. Thus the eggs and sperm came into contact above the water. The female then righted herself, and the male pushed forward again. They swam a short distance, and the same process was repeated. This was done some twelve or thirteen times, an interval of one or two minutes elapsing between each extrusion.

The extruded eggs were surrounded by a gelatinous disk which encircled the sphere in a plane, and held the eggs from rotating; the disk has a circular depression between the egg and the outer rim. This disk gradually widens after extrusion until it becomes about 6 millimeters in diameter. From nine to seventeen eggs are extruded at one time. They could be counted floating together, each group separated from that preceding it. After completing the deposition, the female gave a slight kick and the male, apparently recognizing the signal, unclasped the female, and dived under the water. He reappeared a minute later, crawled over the edge of the tank, hopped to the ground, and started away. The female soon left the tank. Both were captured.

I watched more than ten pairs approach the tank, enter, and go through the same egg-laying process. All were captured after they left the tank.

The ground color on the back varied greatly. There were various shades of brown, red-brown, maroon, clay white, cream yellow, orange, lavender, and purple. Practically no two specimens could be found of exactly the same color. The characteristic markings on the back (two irregular lines crossing on the shoulders, continued brokenly across the folded leg, and large round black spots on the groins usually concealed by the femur when the animal is seated) were invariably present in life. Many, if not all of the males, had deep brown markings on the chin and the throat, and a few had the belly also spotted with dusky. Several specimens had a few scattered, irregular, deep black spots on the back. The stellate yellow dots on sides and belly are present in a large number of the specimens.

A single specimen, almost red above, was taken at Abung-abung, on the southern coast.

Bufo philippinicus Boulenger.

Bufo philippinicus BOULENGER, Ann. & Mag. Nat. Hist. V 19 (1887) 348, pl. 10, fig. 5; TAYLOR, Philip. Journ. Sci. 16 (1920) 344; Amphibians and Turtles of the Philippine Islands (1921) 145.

A splendid series of this species was recently obtained by Gregorio Lopez, at Coron, Busuanga. The series consists of numerous adult, half-grown, and young specimens.

Boulenger established the species on an adult female specimen collected in Palawan by Everett. The species has since been collected at various places in Palawan, Balabac, and Busuanga. Various reports of a large toad occurring in Mindanao have reached me, but I cannot state without doubt the origin of any of the specimens I have examined that are supposed to have come from Mindanao. No species of *Bufo*, as far as I know, has ever been reported authentically from Luzon or from the Visayan Islands. Three small species occur in Mindanao.

The largest specimen, an adult female, measures 92 millimeters from snout to vent. The largest male examined measures 73 millimeters.

The specimens at hand were collected in the daytime by schoolboys. More than twenty specimens were found.

Megalophrys stejnegeri Taylor.

Megalophrys stejnegeri TAYLOR, Philip. Journ. Sci. 16 (1920) 347, pl. 10, figs. 1 and 1a; Amphibians and Turtles of the Philippine Islands (1921) 148, pl. 10, figs. 1 and 1a.

Three specimens of this species were obtained; one from northern Surigao, collected and presented to me by Charles

Fuller Baker; one from Cabalian, southern Leyte, collected by Gregorio Lopez; the third from Zamboanga, Zamboanga, collected by me. The specimens agree with my figure and description.⁵ The Leyte specimen is a male, with the openings of the vocal sacs distinct. The tuberculation on the sides of the three specimens is somewhat more pronounced than in the type. I find no trace of vomerine teeth in any of the specimens.

LIZARDS

Lepidodactylus divergens Taylor.

Lepidodactylus divergens TAYLOR, Philip. Journ. Sci. § D 13 (1918) 242; Lizards of the Philippine Islands (1922) 71.

Visits were made to Great Govenen and Little Govenen, two small islands directly in front of Port Holland, Basilan. Great Govenen, the type locality of this *Lepidodactylus*, was visited twice previously, but in the large series of specimens taken no male was found. The collections made there on October 9, 1920, contained fourteen specimens from the larger island, and twenty-three from the smaller one. One male was found in the first lot; two in the second. The number of preanal pores agrees very well with counts recorded for the preanal scales in the females.⁶

Preanal pores in males of Lepidodactylus divergens Taylor.

No.	Locality.	Preanal pores.
1300	Great Govenen	15-15
1236	Little Govenen	16-18
1284A	do	15-16

The species could not be found along the Basilan coast although great effort was made to find it. No specimen of *Lepidodactylus woodfordi* was found on the islands on this visit. One specimen was found during a previous visit.

Lepidodactylus aureolineatus Taylor.

Lepidodactylus aureolineatus TAYLOR, Philip. Journ. Sci. § D 10 (1915) 97; Lizards of the Philippine Islands (1922) 83.

I collected a single specimen of this species at Abung-abung in southern Basilan. It is an adult male and agrees very well with the type. There are nineteen preanal-femoral pores on each side, which is the exact count in the type; thirteen or fourteen

⁵ Loc. cit.⁶ Taylor loc. cit.

upper labials, twelve lower. The last three upper labials are very small and indistinct.

The specimen was collected under loose bark on a large forest tree. No other specimen was seen. When first collected the color above was dark olive, the belly yellow. A bright golden, black-edged line, extending from the eye to above the auricular opening, is dimly evident in the loreal region. No marking was discernible on the back. The tail is colored like the body, with a few indistinct darker marks.

Sphenomorphus luzonensis (Boulenger).

Lygosoma luzonense BOULENGER, Proc. Zool. Soc. London (1894) 733, pl. 49, fig. 2; TAYLOR, Lizards of the Philippine Islands (1922) 175, pl. 15, fig. 1.

A good series of this small *Sphenomorphus* was collected along the small brooks in the neighborhood of Balbalan, Kalinga.

The specimens were always found in the immediate vicinity of water, and when disturbed they would take refuge by diving in the water and concealing themselves under rocks or débris at the bottom. Several of the specimens are females containing partially developed eggs.

Color in life.—No. 734, the largest specimen taken (101 millimeters), is brown above; median line deep chocolate with ill-defined bluish white spots; a broad chocolate lateral stripe, edged above and below with rows of black and bluish white, ill-defined spots; sides, below the chocolate stripe, salmon to orange with white flecks; backward from the arms the breast and belly are deep orange, more pronounced posteriorly; basal part of tail deep orange, verging into flesh color toward tip. Chin, flesh color to white, flecked with darker. Most of the specimens have the same color and marking. The orange on the belly is usually well pronounced in adults.

Sphenomorphus beyeri sp. nov.

Type.—No. 17, E. H. Taylor collection; collected May 31, 1920, on Mount Banahao, Laguna Province, Luzon, elevation about 1,500 meters, by E. H. Taylor.

Description of type.—Rostral large, clearly visible above, forming a strongly curved suture with the frontonasal; latter wider than long, very narrow laterally, touching first superior loreal, forming a short curved suture with the frontal; prefrontals moderately large, separated, touching two superior loreals, first superciliary, and first supraocular; frontal generally triangular, much longer than wide, very strongly narrowed behind to a point, leaving interorbital region extremely narrow; frontoparie-

tal single, slightly longer and larger than frontal, broader than long; interparietal small, considerably longer than wide; parietals forming a suture behind interparietal; nasal large, single, the nostril pierced near center; nasal followed by two pairs of superimposed loreals, the two upper larger than the lower; three large superimposed preoculars, the median most anterior; orbit separated from labials by two or three rows of small scales, the two above the fourth labial rather enlarged; ten superciliaries, the anterior very large, comparatively; four supraoculars, the anterior triangular, the second widest; last supraocular followed by four curved rows of very small scales, each row with three scales, separating orbit from the very large superior temporal; seven upper labials; four elongate superior temporals lying posterior to one another, the one touching parietal largest; lower temporals small, irregular, numerous; six or seven lower labials; mental moderate, extending back to middle of first upper labial; a very large azygous postmental, followed by two pairs of chin shields, the second small, widely separated; ear opening large, oval, the tympanum not deeply sunk; no anterior lobules; scales in forty rows around the body, the rows on sides regularly longitudinal; two strongly enlarged preanal scales; limbs moderate, the adpressed hind limb reaches to near elbow of the adpressed forelimb; eleven lamellæ under longest finger; seventeen under longest toe.

Color in life.—Head purplish to lavender; body generally lavender-brown, mottled with darker brown; a median indistinct series of blackish spots; lateral, irregular, dark brown lines with light yellow-brown, rounded markings above and below; above the arm and on the neck the lateral dark mark widens, takes a downward course, and is very distinct; the yellow-brown markings below are very distinct; labials purplish, each with a rounded light spot; chin, throat, and sides of neck flesh color, mottled and reticulated with lavender; belly yellow to flesh color; underside of arm yellow; posterior part of femur with round yellow spots and a dark mark on outer side of leg; dark markings above insertion of legs very distinct; tail missing.

Measurements of the type of Sphenomorphus beyeri sp. nov.

	mm.
Total length	46
Snout to vent	42
Width of head	6.5
Length of head	11
Forelimb	12
Hind limb	17
Width of body	7

Remarks.—The specimen was captured on a ledge, on Mount Banahao. The tail was inadvertently broken, and it wriggled off the ledge to an inaccessible point below. The species, judging by the superimposed loreals, is related to *Sphenomorphus curtirostris* Taylor. It differs in the arrangement of the scales in front of and below the eye, and in the nature of the temporals. The colors and markings are different, and several other differences are evident. The new species is represented by the type only, and it is probably very rare. The species is named for Dr. H. Otley Beyer, associate professor of ethnology and anthropology of the University of the Philippines, who has assisted me in making collections.

Tropidophorus stejnegeri sp. nov. Plate 4, fig. 1.

Type.—No. 1538, E. H. Taylor collection; collected at Abung-abung, Basilan, October 22, 1920, by E. H. Taylor.

Description of type.—Rostral nearly perpendicular, not bent back over snout, wider than high, lowest medially; frontonasal much broader than long, touching one loreal laterally; prefrontals much smaller than frontonasal, in contact medially, touching both loreals, and in contact with first supraocular; frontal extending anteriorly to edge of orbit, posteriorly to middle of eye, in contact with three supraoculars; four supraoculars, the third as wide as or wider than second; last supraocular followed by a single small scale; frontoparietals small, forming a suture much more than half their length; interparietal two and one-half times as long as broad; parietals separated, nearly as broad as long, very irregularly shaped, bordered posteriorly by an elongate temporal which is separated from its fellow by four small scales; nostril in single nasal; two loreals, second nearly double the size of first, separated from labials by a narrow intercalated scale, followed by three pre- or suboculars; seven superciliaries; eight upper labials, the first four small, subequal, followed by the fifth which is greatly enlarged; sixth smaller than fifth but larger than seventh; eighth smaller still; a strong diagonal groove in front of eye and another, less pronounced, above anterior labials; temporals numerous, irregular, those above seventh labial rather elongate; eye moderate, the diameter of orbit equaling distance to end of snout; snout short, the outline of head above in profile a strong, rather regular curve; tympanum large, not deeply sunk, much higher than wide, its distance from orbit little greater than orbit or length of snout; five lower labials, the three anterior elongate, the last two very much smaller, mental very slightly wider than rostral, not as

deep; a large azygous postmental; latter followed by three pairs of chin shields, the two anterior in contact medially, the second pair much larger than the first pair, third pair separated by three scales; scales on back strongly keeled, the keels forming longitudinal lines on the six median rows; lateral keels form irregular diagonal lines; scales on belly not keeled; a single large preanal; tail with scales strongly keeled above; median scale row under tail somewhat widened and not keeled; limbs well developed, the adpressed hind limb reaching the elbow of the adpressed forelimb; seventeen lamellæ under fourth finger, twenty-six or twenty-seven under longest toe; tip of tail regenerated.

Color in life.—Above brown, the body traversed by seven broad, brick-red, irregular blotches, separated by a distance less than their width; sides variegated brown with scattered dots of cream yellow; belly yellow; indistinct spots on throat greenish white; a few yellow dots on labials and temporals; a deep brown spot back of eyes; base of tail below yellow; remaining part mottled gray and yellow; tympanum yellowish.

Measurements of the type of Tropicophorus stejneri sp. nov.

	mm.
Total length	185
Snout to vent	93
Tail (partly regenerated)	92
Axilla to groin	48
Forelimb	28
Snout to forelimb	32
Hind limb	41
Orbit to end of snout	6.5
Tympanum to end of snout	18
Width of head, at posterior edge of orbit	13
Greatest width of head	15
Length of head	20

Variation.—There are nine cotypes in the collection, and they differ but little from the type. In two specimens from Zamboanga there are but two supraoculars in contact with the frontal; the Zamboanga specimens have the bars on the back orange and narrower than the interspace separating them; there are twenty-three and twenty-one lamellæ under the toes of the two specimens. Only one specimen, an adult male, from Basilan (No. 1529), has the chin and throat rather purplish (in all others the throat is light with dusky powdering). The belly is yellow. In this specimen the bars on the back are narrow and less prominent than in the type.

Remarks.—This species was found on the Zamboanga Peninsula and in southern Basilan. In both localities *Tropicophorus*

rivularis Taylor was also taken. The two forms are undoubtedly closely related, and many of the actual differences can scarcely be described. The differences in color are strongly marked, particularly the orange or red bars on the back, and the yellow belly. *Tropidophorus rivularis* is usually mottled gray and brown above with indistinct darker bands, the belly red-orange, the throat deep black. The width of the head is greater in this new species as are also the width of the chin shields and the distance between the angle of the jaws; the count of lamellæ under the longest toe is greater. There are only four instead of five labials in front of the large subocular labial. *Tropidophorus rivularis* was never found save along streams and brooks; on the other hand, *T. stejnegeri* was found on spurs of mountains in dry situations, never near water.

Stejneger has described *Tropidophorus misaminius* from northern Mindanao. It is, however, more closely related to *T. rivularis*, since it has the five labials preceding the subocular labials. He states that the keeled scales form eight straight longitudinal rows in his species; in *T. stejnegeri* there are but six.

The species is named for Dr. Leonhard Stejneger, the eminent herpetologist of the United States National Museum, Washington, D. C.

Brachymeles gracilis (Fischer).

Eumeces (Riopa) gracilis FISCHER, Jahrb. wiss. Anst. Hamburg (1885) 11, 85, pl. 3, fig. 1.

Brachymeles suluensis TAYLOR, Philip. Journ. Sci. § D 13 (1918) 254.

Brachymeles gracilis TAYLOR, Lizards of the Philippine Islands (1922) 245, 246.

At the time I was preparing my paper on the genus *Brachymeles*⁷ I did not have at hand Fischer's original description, but depended on Boulenger's Catalogue⁸ for my identifications. I have since obtained a photographic copy of Fischer's paper and find that the species I described as *Brachymeles suluensis* is *B. gracilis* (Fischer) but not *B. gracilis* Boulenger, an entirely different species, which I have named *B. boulengeri*.

Brachymeles gracilis (Fischer) is characterized by the small head, elongate body, and the great distance between the limbs, which are much reduced. The similarity between the head scales of this and those of various other species of the genus is very striking.

⁷ Philip. Journ. Sci. § D 12 (1917) 267-279.

⁸ Cat. Liz. Brit. Mus. 3 (1887) 386-388.

Fischer's figure of the type of *Brachymeles gracilis* is drawn $\times 4$, while that of *B. schadenbergi* is $\times 2$ —a point which I at first overlooked; I suspect others have done likewise. In the descriptions, Fischer fails to give head measurements for either species. There are specimens in my collection of both *B. schadenbergi* and *B. boulengeri* whose head scales are identical with those as shown in Fischer's drawing of *B. gracilis*; there are young specimens of *B. boulengeri* which approach the measurements given for *B. gracilis* (Fischer), but the limbs are invariably longer in specimens of equal snout-to-vent measurements, and are contained in the axilla-to-groin distance a fewer number of times than is the case in *B. gracilis* (Fischer).

Three specimens of this rare species were found on Basilan; two near Isabela, in the western part, and one at Abung-abung, on the southern coast. The type specimen of *B. suluensis* came from Bubuan, an island a short distance southwest of Basilan. There are two or three specimens of *Brachymeles* in the United States National Museum that I believe belong to this species. They were taken in Cotabato Province, Mindanao. I am indebted to Dr. Leonhard Stejneger for permission to examine these specimens. It was Doctor Stejneger who first suggested to me that *B. gracilis* (Fischer) and *B. suluensis* Taylor might be identical.

Measurements of Brachymeles gracilis (Fischer).

	No. 1172.	No. 1173.	No. 1520.	Type of <i>B. gra- cilis.</i>	Type of <i>B. sulu- ensis.</i>
	mm.	mm.	mm.	mm.	mm.
Total length	93	* 111	132	-----	117
Snout to vent	49	71	66	67	81
Snout to forelimb	15	17.5	18	18	19
Axilla to groin	31	50.5	46	45	55
Width of head	6	7.5	7	?	7
Forelimb	5.5	6	6	6	6
Hind limb	8	11	11.5	12	^b 11-13

^a Tip of tail regenerated.

^b The type has one hind limb measuring 11 millimeters, the other 13 millimeters.

Remarks.—No. 1172 agrees with the type in the scalation of the head. However, it has twenty-six instead of twenty-four scale rows around the body. The length of the leg is contained in axilla-to-groin distance approximately four times.

No. 1173 agrees with the type in scalation, save that the frontal and frontonasal are more broadly in contact. The post-parietal body scales on the left side are fused, forming an

elongate nuchal. The length of the leg is contained in the axilla-to-groin distance four and six-tenths times. Scales in twenty-four rows around body.

No. 1520, collected at Abung-abung, differs from the type in having the parietal broken into two scales, as have certain specimens of *Brachymeles vermis* Taylor and *Sphenomorphus biparietalis* Taylor, both from the Sulu region. The first pair of chin shields is separated by a small single shield. Scales in twenty-four rows around body.

This species probably does not attain as large a size as the other pentadactyl species of the genus. It is a burrowing form and is usually found under logs or stones. The lizards of this species move with great rapidity. It is difficult to grasp them because of their extremely smooth scales.

***Brachymeles schadenbergi* (Fischer).**

Eumeces (Riopa) schadenbergi FISCHER, Jahrb. wiss. Anst. Hamburg 2 (1885) 87, pl. 3, fig. 2.

Brachymeles schadenbergi TAYLOR, Philip. Journ. Sci. § D 12 (1917) 268; Lizards of the Philippine Islands (1922) 249.

Twenty-one specimens of this species were taken at Zamboanga, Basilan, and Jolo. They agree very well in color and markings. A single specimen was collected in southern Leyte, by Gregorio Lopez.

The head scales are variable. Thus, of the twenty-two specimens, twenty-one have the supranasals in contact and one has them separated. In seventeen specimens the parietals form no suture; in five specimens they do. Seven specimens have the fourth labial entering the orbit; fifteen, the fourth and fifth. The character of the chin shields is apparently invariable, save in one Jolo specimen, which has the second pair wider than the first pair.

***Brachymeles vermis* Taylor.**

Brachymeles vermis TAYLOR, Philip. Journ. Sci. § D 13 (1918) 255, fig. 10; Lizards of the Philippine Islands (1922) 258, fig. 53.

Eight specimens of this small wormlike form were collected on the Government cattle ranch near the central part of Jolo Island. They were found under leaves and trash along a small stream.

All the specimens agree in the arrangement of the chin shields; that is, having the first pair separated and the second pair wider than the first pair, separated by a single scale. All have the postmental in contact with a single labial.

In the conformation of the head scales they agree in general

with the type. The nasals are broadly separated in the eight specimens; the prefrontals are separated in seven, in contact in one; the frontoparietals are separated in the eight specimens, the parietals separated in seven, and forming a suture in one. Small nuchals are present in all the specimens. In a single specimen, the parietals are broken as shown in the drawing of a cotype.⁹

Dibamus argenteus Taylor. Plate 4, fig. 2.

Dibamus argenteus TAYLOR, Philip. Journ. Sci. § D 10 (1915) 107, pl. 1, figs. 11 and 12; Lizards of the Philippine Islands (1922) 261.

Several specimens belonging to this species were collected on Basilan at Port Holland. Specimens were found under rotting logs in a cut-over area. All of the specimens show the irregular silver blotches on the body. I have already reported, in my work on the lizards of the Philippine Islands, the Negros and Papahag specimens that are listed in the table.

Measurements and scale counts of Dibamus argenteus Taylor.

No.	Locality.	Collector.	Sex.	Length	Tail.	Scale rows.	Upper labials.	Scales bordering interparietal.	Length of leg.
				mm.	mm.				mm.
1216	Port Holland, Basilan.	E. H. Taylor	♀	132	19.5	22	1	5	
1219	do	do	♀	126	18.5	22	1	6	
1220	do	do	♂	88	13.0	22	1	6	2
1221	do	do	♂	123	19.0	22	1	6	3.6
1258	do	do	♂	122	19.5	22	1	5	4.0
L341	Negros	do	♀	154	23.0	22	1	7	
L257	Papahag Island, Sulu.	do	♂	120	(?)	22	1	7	3.5

The limbs of this species appear to be larger and better developed than in *Dibamus novae-guineae* Duméril and Bibron. In Boulenger's illustration the limbs appear to be covered¹⁰ with one large terminal scale and a single pair of scales above or, at most, three scales. In my specimens the limb has a large, rather pointed, terminal scale with three or four pairs of smaller scales; the preanals, too, are different, consisting of two elongate scales separated by two or three scales, the tips of these overlying a sharply pointed scale which lies directly on the edge of the anus. In the females the arrangement of the preanals is

⁹ Taylor, loc cit., fig. 10d.

¹⁰ Fauna Malay Peninsula, Rept. & Batr. (1912) figs. 26 A and B.

also different. The tail length of this species is contained in the body length an average of six and six-tenths times.

SNAKES

Natrix barbouri sp. nov.

Tropidonotus crebripunctatus BOULENGER (non Wiegmann), Cat. Snakes Brit. Mus. 1 (1893) 262.

Natrix crebripunctata TAYLOR, Snakes of the Philippine Islands (1922) 91.

Type.—No. 939, E. H. Taylor collection; collected at Balbalan, Kalinga, Luzon, April 26, 1920, by E. H. Taylor.

Description of type.—(Adult male.) Rostral much broader than high, slightly visible above; internasals longer than broad, longer than prefrontals; latter broader than long, much broader than internasal; frontal bell-shaped, the anterior edge nearly a straight transverse line; length of frontal equal to or slightly less than supraocular, slightly longer than its distance from end of snout; supraoculars elongate, slender, at least two and one-half times as long as broad; parietals only very slightly longer than frontal, the width equal to three-fourths the length; nasal divided, anterior part lower and longer than posterior part; loreal nearly square, much lower than nasal; two preoculars, the upper broader than the lower (three on right side); eye large, its diameter equal to its distance from anterior edge of anterior nasal scale; four postoculars; two anterior temporals, the lower much the larger, touching two postoculars; three equal-sized posterior temporals; nine upper labials, the fourth, fifth, and sixth entering orbit; ten lower labials, five touching anterior chin shields; mental broadly triangular, much wider than deep, not as wide as rostral; anterior chin shields forming a suture their entire length, not three-fourths as long as second pair, which are separated their entire length; scales in 19 rows, all strongly keeled, with apical pits; ventrals, 169; anal, divided; subcaudals, 107; tail long, slender, ending in a sharp point.

Color in life.—Gray above with transverse indistinct bands of black, broken laterally by yellowish spots; head olive without markings; neck dark without a yellow spot; upper labials yellow, edged with black above and a small spot on each of the first three labials; lower labials, chin, and throat white; a row of black dots on outer edge of ventrals strongly defined to tip of tail; outer edges of ventrals marked with gray on anterior part of belly; on latter half the entire belly also gray; under tail gray with edges of subcaudals yellowish.

Measurements of the type and the cotype of *Natrix barbouri* sp. nov.

	Type, ♂.	Cotype, ♀, No. 836.
	mm.	mm.
Total length.....	803	820
Snout to event.....	553	560
Tail.....	250	260
Width of head.....	11.5	13
Length of head.....	20	20
Diameter of eye.....	6	6
Eye to end of snout.....	6.4	6.3

Remarks.—In a previous publication¹¹ I stated in a footnote: “I strongly suspect that *N. crebripunctata* Wiegmann is indeed *N. spilogaster*. I believe further that Boulenger’s species of this name is a distinct species.” After obtaining a copy of Wiegmann’s type description, and comparing it with young and half-grown specimens of *Natrix spilogaster* (Boie) from Manila, and after obtaining specimens of a *Natrix* which is undoubtedly Boulenger’s *Tropidonotus crebripunctatus* and comparing these with Wiegmann’s type description, I have no hesitancy in placing *Tropidonotus crebripunctatus* of Wiegmann as a synonym of *Natrix spilogaster* (Boie) and making a new species of the *Natrix* I have found, and which appears to be the same as that which Boulenger calls *T. crebripunctatus*.

Variation.—There are only two specimens in my collection and a very young one in the collection of the College of Agriculture at Los Baños that I believe belong to this species.

The cotype is likewise from Balbalan, Kalinga. It differs somewhat in scale counts from the type, as follows: Ventrals, 163; subcaudals (tip of tail missing), 95; preoculars, 3; postoculars, 2 on right, 3 on left side. In other respects the specimen agrees with the type in scalation.

The scale counts for the College of Agriculture specimen are: Ventrals, 160; subcaudals, 100; preoculars, 2; postoculars, 3; temporals, 2+2 and 2+3. It likewise agrees with the type save that the head is proportionately larger, as is natural in very young specimens.

In color the cotype differs from the type in having a very narrow yellow line on the median dorsal surface, broken by narrow black spots less than half the length of the intervening yellow. This continues some distance on the anterior part of the body. The entire latter half of the belly is gray, as well as

¹¹ Snakes of the Philippine Islands (1922) 92.

the subcaudal area. This vertebral stripe is mentioned in Boulenger's description¹² as being present.

In comparing these specimens with Wiegmann's description I find that none of the three specimens has the white nuchal spot ("der Nacken dunkler mit einem weissen Fleck"), which is invariably present in *Natrix spilogaster*; the two small spots on the parietal scales are wanting ("die beiden Punkte der Occipitalschilder, die auch bei andern Kielnatter-Arten in Jugendalter vorkommen"), and there is only a single irregular row of black dots on the outer edge of the ventrals instead of innumerable black dots arranged in transverse rows as is true in *Natrix spilogaster*. ("Die Bauchseite ebenfalls weisslich, aber mit unzähligen schwarzen Punkten bedeckt, die auf den einzelnen Bauchschildern in Querreihen zu 6-10 stehen".) The ventral and subcaudal counts of Wiegmann's specimen (148 and 96) are well within the range for *N. spilogaster*, but much lower than in the species described, in which they are 163 to 169 for ventrals and 100 to 107 for subcaudals.

The species is named for Dr. Thomas Barbour, the eminent herpetologist of the Museum of Comparative Zoölogy at Harvard College, Cambridge, Mass.

Natrix lineata (Peters).

Tropidonotus lineatus PETERS, Mon. Berl. Ak. (1861) 686.

Natrix lineata TAYLOR, Snakes of the Philippine Islands (1922) 92.

I collected three specimens of this snake along Tumugao River, Zamboanga, Mindanao, and seven specimens on Basilan, at Port Holland and Abung-abung. In general they differ from specimens collected in Agusan, Mindanao, in color and markings. Most of the Agusan specimens are dull black above with no markings distinguishable save in very young specimens. In all ten specimens the color is light olive above, with a regular network of black markings and an indistinct series of yellowish dots on the sides. The ventrals and subcaudals have a large dusky area near the middle. The head is deep brown. The strongly defined yellow labial line is present in all the specimens. All of them show a dark nuchal band with a light, irregular, nuchal spot.

No. 1403, the largest specimen collected, was found at night near an old unused well where *Polypedates pardalis* were breeding. In life the colors were as follows: Top of head and anterior part of body reddish brown, gradually becoming olive on the

¹² Loc. cit.

posterior part of body and tail; line on lip brownish white; chin and throat white; neck spot white; belly with dirty olive markings; outer edges of ventrals pinkish. Most of the specimens were taken under rocks along small rivers. The known ventral range of the species is 132 to 142; the subcaudal, 61 to 73.

Measurements and scale counts of Natrix lineata (Peters).

No.	Locality.	Collector.	Age or sex.	Length. mm.	Tail. mm.	Ventrals.	Subcaudals.	Anal.	Preoculars.	Postoculars.	Upper labials.	Lower labials.	Labials enter eye.	Labials touch chin shields.	Temporal.
1015	Zambo- anga.	E. H. Tay- lor.	♂	463	120	139	73	2	2	3	8	10	3, 4, 5	5	1+3
1046	do	do	♂	412	107	136	68	2	2	3	8	10	3, 4, 5	5	1+3
1016	do	do	♂	305	73	137	68	2	2	3	8	10	3, 4, 5; 4, 5	5	
1403	Port Hol- land, Basi- lan.	do	♀	598	140	132	61	2	1-2	3	8	9-10	3, 4, 5	4-5	1+3
1480	Abung- abung, Basi- lan.	do	yg	266	62	134	64	2	2	3	8	10	3, 4, 5	4-5	1+3
1481	do	do	♀	430	105	136	64	2	1	3	8	10	4, 5	5	1+3
1590A	do	do	♂	550	140	133	68	2	2	3	8	10	3, 4, 5; 4, 5	5	1+3
1590B	do	do	yg	260	57	133	62	2	1-2	3	8	10	3, 4, 5	5	1+3
1590C	do	do	yg	253	60	132	67	2	3-2	3	8	10	3, 4, 5	5	1+3
1590D	do	do	♀	463	120	132	69	2	2	3	8	10	3, 4, 5	5	1+3

Natrix dendrophiops (Günther).

Tropidonotus dendrophiops GÜNTHER, Ann. & Mag. Nat. Hist. V 11 (1883) 136, fig.

Natrix dendrophiops dendrophiops TAYLOR, Snakes of the Philippine Islands (1922) 95.

One specimen of this rare species was collected at Port Holland, Basilan. Its presence was discovered by hearing the cry of a frog which it had just caught and was beginning to eat. It was the only specimen seen. *Natrix lineata* (Peters) and *Natrix auriculata* (Günther) were taken in the same locality.

Color in life.—Head and anterior fifth of body olive to olive brown, gradually more brownish on the second fifth; latter three-fifths of body olive to dull olive brown. On the second fifth distinctly maroon to red-brown on sides, more pronounced

on the edges of the ventrals; the yellow spots in the black cross-bands are strongly pronounced, continuing some distance on the tail, less distinct on the neck. No spots on the parietals and no nuchal spot; black marks on lower labials at the sutures; spots on the first three upper labials and on the sixth.

Scalation.—Nine upper labials, ten lower labials; one preocular on left, two on right; three postoculars; temporals two, followed by three, the lower anterior very large; scales in seventeen rows; tip of tail missing; anal, double; ventrals, 168. This is the first record of the snake from Basilan.

This species differs from *Natrix barbouri* sp. nov. in the larger eye and the dentition.

Oxyrhabdium modestum (Duméril and Bibron).

Stenognathus modestus DUMÉRIL and BIBRON, Erp. Gén. 7 (1854) 504.
Oxyrhabdium modestum TAYLOR, Snakes of the Philippine Islands (1922) 100.

I collected three specimens of this snake in 1920; two near Zamboanga, and one on Basilan Island. Gregorio Lopez collected a specimen at Cabalian, Leyte. The specimens from Zamboanga and Basilan have rather shorter, wider heads than the Leyte specimen has, and a higher average of ventrals, the counts for the two Zamboanga specimens being much higher than any recorded counts. The known range is: Ventrals, 162 to 189; subcaudals, 49 to 66. The chin shields of the Leyte specimen are longer and narrower than those of the other specimens. The Zamboanga specimens were found in a rotted tree stump. The Basilan specimen collected at Abung-abung was found at the base of a small palm tree.

Measurements and scale counts of Oxyrhabdium modestum (Duméril and Bibron).

No.	Locality.	Collector.	Sex.	Length. mm.	Tail. mm.	Ventrals.	Subcaudals.	Upper labials.	Lower labials.	Labials enter eye.	Labials touch chin shields.	Postoculars.
1017.....	Zamboanga.	E.H. Taylor.	♀	445	75	189	62	8	7	5-6	5	2
1047.....	do	do	♀	482	80	186	57	7	7-6	4-5	4-5	2
1593.....	Basilan	do	♀	340	62	174	58	8	6	5-6	4	2
0000.....	Leyte	Gregorio Lopez.	♂	500	98	165	57	9-8	7	5:6:7 5:6		

Oxyrhabdium leporinum (Günther).

Rhabdosoma leporinum part., GÜNTHER, Cat. Col. Snakes Brit. Mus. (1858) 12.

Oxyrhabdium leporinum TAYLOR, Snakes of the Philippine Islands (1922) 103.

Three specimens are in the collection, one collected by myself along the mountain trail near Haight's (Pauai); the other two were collected by Father F. Sanchez, S. J., at Baguio, and presented to me. No. 697 when taken was light olive to yellow-green above, dusky below. This specimen differs from the other two in having the chin shields together, forming a circle. The shields are shorter and wider than normal. No. 384 is a young specimen with a broad light area behind the eye which narrows above and crosses the occiput on the posterior edges of the parietals. The body is crossed by thirty-seven narrow yellow lines not wider than a single scale.

Measurements and scale counts of Oxyrhabdium leporinum (Günther).

No.	Locality.	Collector.	Age or sex.	Length.	Tail.	Ventrals.	Subcaudals.	Upper labials.	Lower labials.	Labials enter eye.	Labials touch chin shields.	Scale rows.	Temporals.
				mm.	mm.								
697	Mountain trail, Benguet.	E. H. Taylor	♂	640	92	175	42	7	6	4, 5	4	15	1+2
547	Baguio, Benguet.	Father Sanchez.	♀	540	90	169	49	7	6	4, 5	4	15	2+2 1+2
384	do	do	yg	235	36	167	45	7	6	4, 5	4	15	1+2

Zaocys luzonensis Günther.

Zaocys luzonensis GÜNTHER, Proc. Zool. Soc. London (1873) 169; TAYLOR, Snakes of the Philippine Islands (1922) 135, pl. 12, figs. 1 and 3; pl. 13, figs. 1 and 2.

Three specimens of this rare snake were obtained; one in northern Kalinga at Balbalan, one in Polillo Island, and the third was presented to me by Mr. O. W. Pflueger of the School of Forestry at Los Baños. The Polillo specimen is very young and differs so markedly in coloration that I suspected when I collected the specimen that it was new.

Variation.—The Kalinga specimen is brown above on the anterior part of the body, each scale with a black area or edged with black. The middle third of the body is lighter

brown, the scales more deeply edged with black; in fact, the black is predominant. The latter third has the black still more prominent, with groups of flowerlike yellow-brown spots on each side of the median line of the back. The tail is entirely black save on the basal third, which has a few spots arranged in two rows on the dorsal surface. Chin and anterior third

Measurements and scale counts of Zaocys luzonensis Günther.

No.	Locality.	Sex.	Length.	Tail.	Ventrals.	Subcaudals.	Anal.	Upper labials.	Lower labials.	Labials touch chin shields.	Preoculars.	Postoculars.	Temporals.	Scale rows.
			mm.	mm.										
811	Kalinga	♂	1,640	480	192	122	2	9-8 8	9	5	1-2	3	2+2 2+2+1 1	14
295	Polillo		508	138	202	124	2	8	9	5	2	2	2+2	14
000	Los Baños		2,060	580	201	126	2	8	8-9	5	3-2	2	2+2	14

of belly flesh color; median third flesh color anteriorly, each ventral edged with black and growing heavier posteriorly; posterior third of belly and under tail deep black. The snout is light brown; the top of the head black-brown with no markings on labials.

The specimen from Los Baños differs in having much less black on the posterior part of the body. The yellow-brown spots continue to near the tip of the tail. The young Polillo specimen is gray, reticulated with black. On the anterior part of the body there are some dim white bars. The anterior part of the belly is flesh-colored; the posterior part and underside of tail black.

Holarchus meyerinkii (Steindachner).

Holarchus meyerinkii TAYLOR, Snakes of the Philippine Islands (1922) 139.

I found a single young specimen of this species near Indanan, Jolo. I unearthed it from under débris collected about the base of a large tree. When exposed it crawled very slowly.

Description.—(No. 1710.) The specimen agrees with that figured in my Snakes of the Philippine Islands in the scalation of the head, save that the nasal is entirely divided instead of only partially. The scale counts are: Ventrals, 157; anal, single;

subcaudals, 46. There are eight lower labials on the left side and seven on the right. Four lower labials touch the first pair of chin shields on the right side, and five on the left. Total length, 160 millimeters; tail, 27.

Color in life.—Above striped, dull salmon pink and brown; a pair of broad, dark brown stripes, each covering two whole and two half rows of scales, separated by a salmon pink, straight-edged, median stripe, covering one whole and two half rows of scales; the inner edge of the brown stripes on either side is deep black, and the outer edge with numerous black dots; below the broad stripes laterally is a flesh-colored stripe covering two half scale rows; below this another brown, black-edged stripe, also covering two half rows of scales; below this another dull flesh-colored line covering parts of two scale rows, below which is another line, nearly black, covering parts of two scale rows; another flesh pink line follows, covering part of the outer scale row and the edges of the ventral, the ventrals with elongate spots on each side forming a narrow black line; belly flesh color to coral pink; a curved, rather broad line crossing head involving eyes; the median brown lines meet on the frontal; a line across the angle of mouth; deep black spots on the anterior ventrals.

Remarks.—The specimens whose scale counts are available give the following variation: 156 to 162 for the ventrals, average 158; subcaudals, 43 to 48, average 45. It will be noted that this form differs from *Holarchus octolineatus* (Schneider) not only in the lower ventral count but also in a very much lower subcaudal count.

***Psammodynastes pulverulentus* (Boie).**

Psammophis pulverulenta BOIE, Isis (1827) 547.

Psammodynastes pulverulentus TAYLOR, Snakes of the Philippine Islands (1922) 209.

Fifteen specimens were collected in Zamboanga, Basilan, and Jolo. I failed to find it in the other localities in which I made collections. This widely distributed species varies greatly in color, but in the material examined I cannot separate any varieties. The table shows the average ventral counts for five Basilan specimens as 170; the average for three Jolo specimens as 152; for the seven specimens from Zamboanga, 163. There is less variation in the subcaudal counts. The known range for ventral and subcaudal counts is 151 to 179, and 53 to 69, respectively. Females are darker for the most part than males.

Table of measurements and scale counts of *Psammodynastes pulverulentus* (Boie).

No.	Locality.	Collector.	Sex or age.	Length.	Tail.	Ventrals.	Subcaudals.	Preoculars.	Postoculars.	Loreals.	Upper labials.	Lower labials.
				mm.	mm.							
1018	Zambo- anga.	E. H. Tay- lor.	♂	315	58	163	58	2-3	2	2	8	7
1080	do	do	yg	290	61	160	62	2	2	1	8	7
1102	do	do	♂	354	75	156	65	2	2	2	8	7
1111	do	do	♀	405	73	168	59	2	2	2	8	7
1112	do	do	♂	395	64	161	^a 44	2	2	1	8	7
1113	do	do	♀	493	90	165	59	2	2	2	8	7
1114	do	do	♀	490	89	167	63	2	2	2	8	7
1482	Basilan	do	♀	445	80	170	55	2	3	2	8	7
1556	do	do	yg	184	34	170	61	2	2	2	8	7
1588	do	do	yg	181	31	179	55	3	2	2	8	7
1591	do	do	♂	345	58	174	55	1	2	1	8	7
1591A	do	do	yg	275	55	160	63	1	2	1	8	7
1722	Jolo	do	yg	365	78	146	59	2	2	2	8	7
1723	do	do	♀	376	67	156	57	2	3	2	8	7
1862	do	do	♀	395	78	154	57	2	3	2	8	7

^a Tip of tail missing.***Boiga dendrophila divergens* Taylor.***Boiga dendrophila divergens* TAYLOR, Snakes of the Philippine Islands (1922) 201.

Two specimens of this recently described form have been taken; one (No. 301) in Polillo, the other (No. 2006) on Mount Maquiling, near the School of Forestry. The gray color of No. 2006 is strongly pronounced; the black color of the body merely borders the yellow crossbands. No. 301 has the loreal entering the eye; in No. 2006 the loreal is separated from the orbit by the preocular; the second pair of chin shields is smaller.

Scale counts.—No. 301: Ventrals, 221; subcaudals, 94. No. 2006: Ventrals, 227; subcaudals, 95. No. 301 has 74 yellow bars; No. 2006 has 100.

Remarks.—The fact that the specimens of *Boiga dendrophila* from Luzon and Polillo (the Samar record¹³ is doubtful) show more resemblance to the Palawan form than to the Mindanao form is rather inexplicable. Using reptiles and amphibians as criteria there is very little evidence to show that Palawan has ever had any land connection with any part of the Philippines east of the Sulu Sea. In consequence, we would expect that

¹³ Taylor, loc. cit.

a Luzon form would show more similarity to the well-defined color form of *Boiga dendrophila latifasciata* which occurs in Mindanao. It is, of course, not improbable that both subspecies occur in Mindanao. However, no specimen of *B. d. divergens* has been found there.

Hemibungarus calligaster (Wiegmann).

Elaps calligaster WIEGMANN, Nova Acta Acad. Leop.-Carol. 1 17 (1835) 253, pl. 20, fig. 2.

Hemibungarus calligaster TAYLOR, Snakes of the Philippine Islands (1922) 269.

Three specimens of this species were obtained at Los Baños; one through the courtesy of Prof. Charles Fuller Baker, dean of the College of Agriculture, the other two from Prof. O. W. Pflueger, director of the School of Forestry. No. 40 presents an interesting variation in the relative length and width of the body, as shown by the table. It varies also from the normal in having the first lower labials separated and the mental in contact with the first pair of chin shields. This condition is also present in No. 41. The very low subcaudal count and the high ventral count of No. 40 are also extraordinary. The tail is doubtless abnormal; there is no evidence that the shortening is due to injury.

It is presumed that these specimens were collected low on Mount Maquiling, about the grounds of the College of Agriculture and the School of Forestry.

Measurements and scale counts of Hemibungarus calligaster (Wiegmann).

	No. 40, ♀.	No. 54, ♀.	No. 41, ♂.
Width of body mm.	6	9	9
Width of head mm.	5.5	8.5	7
Length mm.	460	508	455
Tail mm.	18	26	25
Ventrals	256	224	228
Subcaudals	12	20	20
Lower labials	5	7	6
Labials touch chin shields	3	4	3

Hemibungarus mcclungi Taylor.

Hemibungarus mcclungi TAYLOR, Snakes of the Philippine Islands (1922) 272, pl. 33, fig. 3; pl. 34, figs. 3 and 4.

A specimen of this rare snake was taken on the road to Bislian on Polillo. However, it was attacked by ants when killed and certain of the head scales were destroyed. The characteristic shape of the frontal plate is clearly evident. Total length, 310

millimeters; tail, 26. Anal, single; ventrals, 204; subcaudals, 22.

Color in life.—The body is nearly black above with very indistinct dotted bands of cream on neck; belly banded with intense black and coral red, the red lighter on neck. The black bands below, each incorporating an elongate narrow white stripe.

The species is obviously distinct from *Hemibungarus calligaster* and is very probably confined to Polillo or the Polillo group of islands.

Doliophis philippinus (Günther).

Callophis intestinalis var. *philippina* GÜNTHER, Rept. Brit. India (1864) 349.

Adeniophis philippinus MEYER, Sitzb. Ber. Ak. Wiss. Berlin 36 (1886) 614.

Doliophis philippinus TAYLOR, Snakes of the Philippine Islands (1922) 277, pl. 35, figs. 1 and 2.

A single specimen of this rare species was collected in the mountains lying back of the Zamboanga waterworks intake. It was found near the summit, under a decayed log. When disturbed the tip of the tail was turned up to display the bright red spots beneath.

Description of specimen.—(No. 1100, E. H. Taylor collection.) Female. Total length, 390 millimeters; tail, 26; width of head, 4.5; length, 7.5. Ventrals, 260; subcaudals, 21; anal, single.

Color in life.—Above brown with a black median stripe covering three whole and two half rows of scales, inclosing longitudinal brown spots much longer than the interspaces between them; on either side of the black stripe are narrow brown stripes covering parts of two scale rows; below these a narrow black line which merges in the large black blotches on the belly; black blotches separated by pink to flesh white blotches, which reach the third outer scale row on side; spots below tail bright red.

Naja naja philippinensis Taylor.

Naja naja philippinensis TAYLOR, Snakes of the Philippine Islands (1922) 265.

I have obtained two adult specimens of the Philippine brown cobra; one (No. 869) from Los Baños, presented to me by Prof. C. F. Baker, dean of the College of Agriculture, and a second specimen, collected near Antipolo by Mrs. R. M. McCrory. The Los Baños specimen has a very much longer head than the Antipolo specimen. The measurements are 52 and 43 millimeters, respectively.

Measurements and scale counts of Naja naja philippinensis Taylor.

	No. 869, ♂.	No. 000, ♂.
Length mm.	1,423	1,120
Tail mm.	195	140
Ventrals	190	184
Subcaudals	46	40
Upper labials	7	7
Lower labials	8-9	9
Scale rows:		
Neck	25	23
Body	21	21

Naja naja samarensis (Peters).

Naja tripudians var. *samarensis* PETERS, Mon. Berl. Ak. (1861) 690.

Naja naja samarensis TAYLOR, Snakes of the Philippine Islands (1922) 259.

A single specimen of this subspecies was collected near a trail which follows Tumugao River, some 20 kilometers from Zamboanga.

Color in life.—The specimen is uniform black; the skin between scales, bright yellow. None of the scales has yellow spots. Chin yellow. Beginning with the fifth ventral the following twenty scales are deep black, gradually becoming cream. Outer edge of ventrals of most of the scales with dusky spots.

This subspecies is not rare in Zamboanga; several of the snakes have been seen or killed on the golf links.

Measurements and scale counts of Naja naja samarensis (Peters).

Length (mm.)	1,010
Tail (mm.)	165
Ventrals	173
Subcaudals	48
Scale rows on neck	21
Scale rows around body	19
Upper labials	7
Lower labials	8
Labials touching first chin shields	4

Trimeresurus wagleri wagleri (Boie).

Trimeresurus wagleri wagleri TAYLOR, Snakes of the Philippine Islands (1922) 298.

A specimen of this subspecies has been recently obtained from Balabac Island. It is uniformly green above, with two series of very small white dots on the back. The tail is brown on the tip, and has several larger white dots. Ventrals, 142; anal, single; subcaudals, 51. The subocular is separated from the labials.

ILLUSTRATIONS

PLATE 1

- FIG. 1. *Rana yakani* sp. nov.; photograph of a cotype specimen from Basilan, about natural size.
2. *Rana suluensis* Taylor; photograph of specimen from Jolo, enlarged.
 3. *Micrixalus diminutiva* sp. nov.; photograph of cotype specimen from Zamboanga; actual length, snout to vent, 20 millimeters.
 4. *Micrixalus diminutiva* sp. nov.; photograph of cotype specimen from Zamboanga; actual length, snout to vent, 20 millimeters.

PLATE 2

- FIG. 1. *Rana yakani* sp. nov.; photograph of No. 1027, male, a cotype specimen from Zamboanga; actual length, snout to vent, 48 millimeters.
2. *Micrixalus diminutiva* sp. nov.; photograph of the type specimen, from Zamboanga; actual length, snout to vent, 21 millimeters.
 3. *Micrixalus diminutiva* sp. nov.; photograph of a specimen from Jolo; actual size, snout to vent, 20 millimeters. Note the lesser extent of webbing on hind foot.

PLATE 3

- FIG. 1. *Rana igorota* sp. nov.; photograph of a cotype from Kalinga, about natural size.
2. *Polypedates linki* sp. nov.; photograph of the type specimen.

PLATE 4

- FIG. 1. *Tropidophorus stejnegeri* sp. nov.; photograph of the type. The characteristic markings on the back fail to appear in the photograph.
2. *Dibamus argenteus* Taylor; anal region, from a Basilan specimen; enlarged.
 3. *Cornufer rivularis* sp. nov.; photograph of the type specimen.
 4. *Cornufer montanus* sp. nov.; photograph of the type specimen.

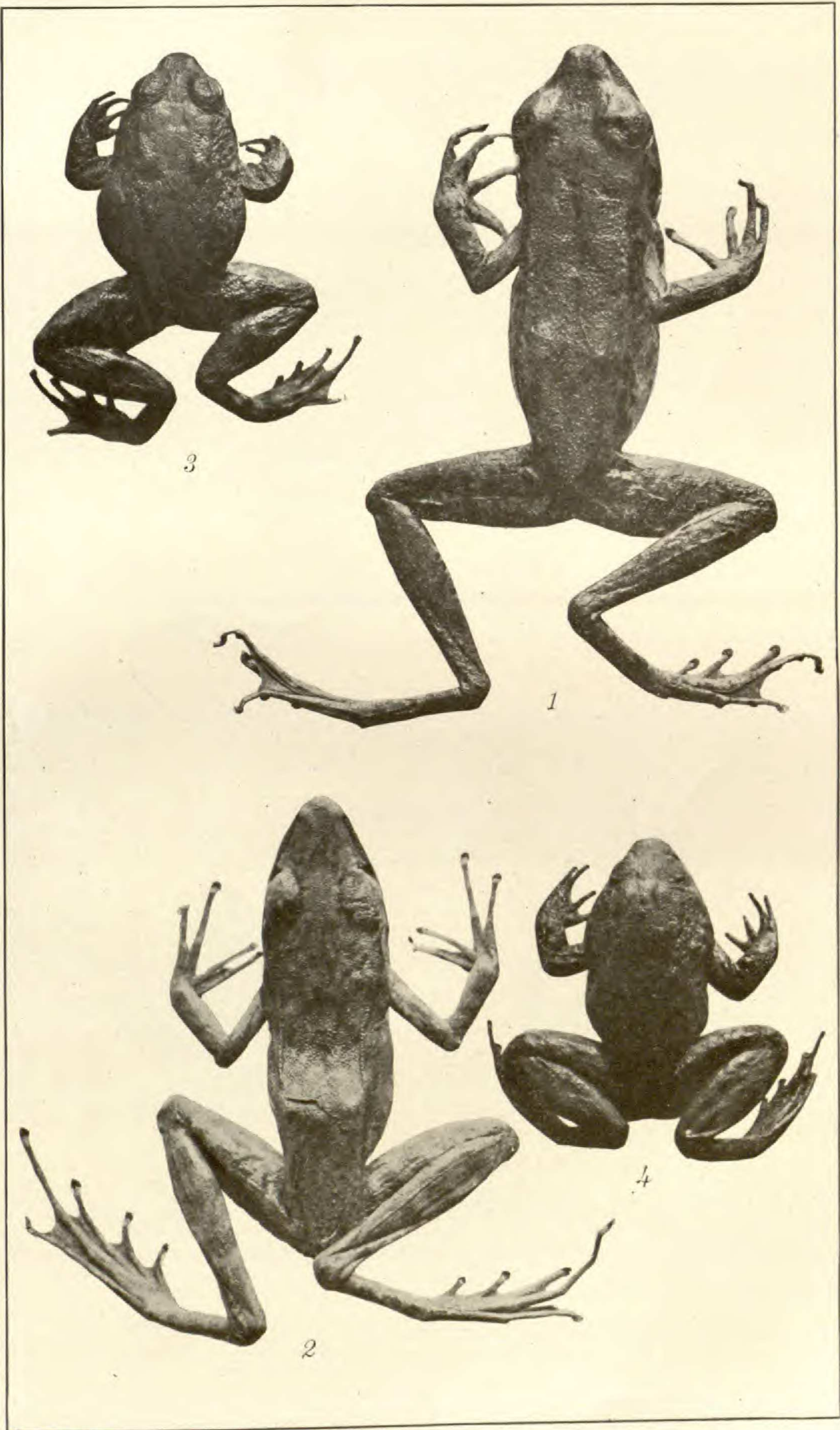


PLATE 1.

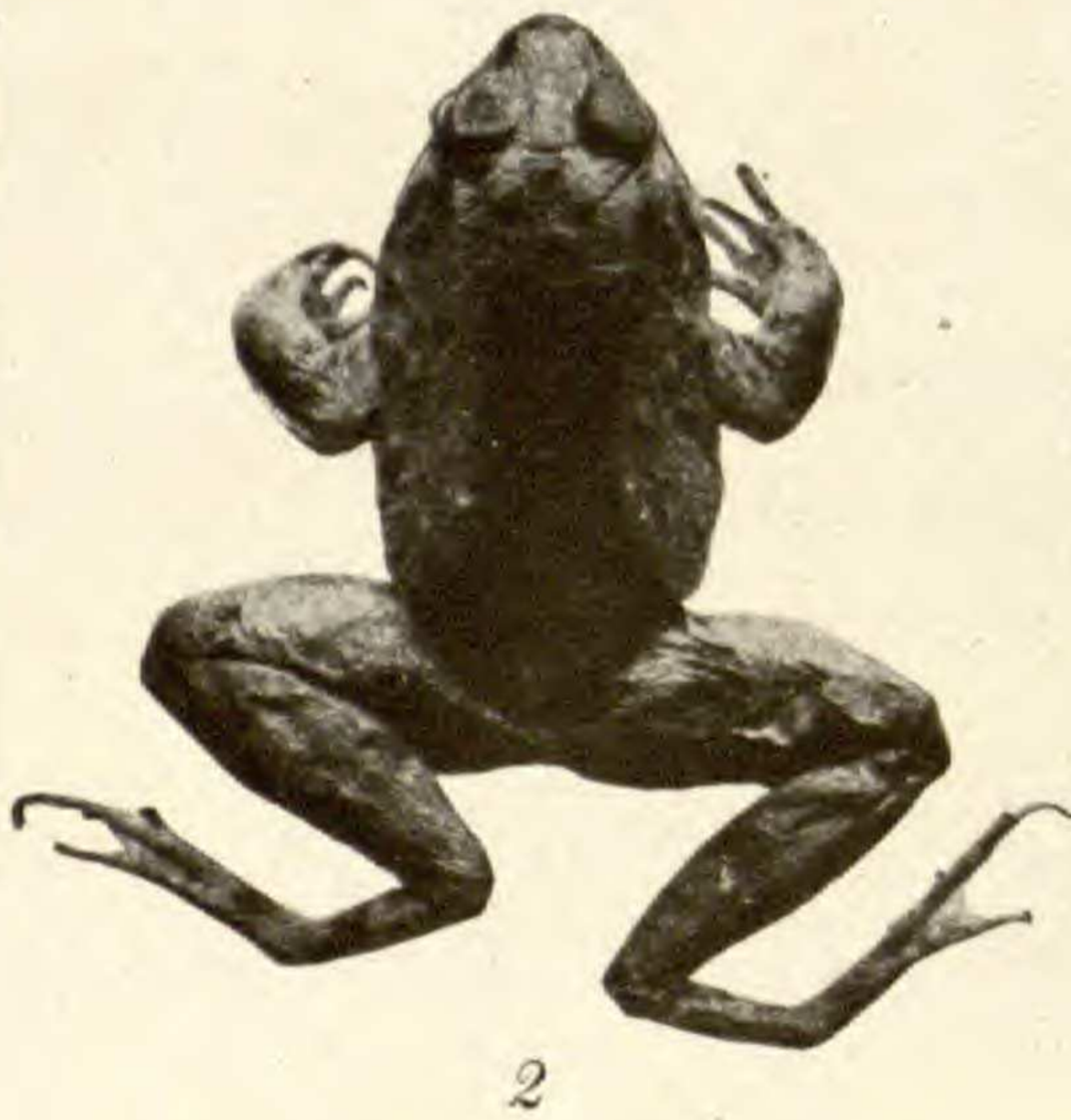




PLATE 3.

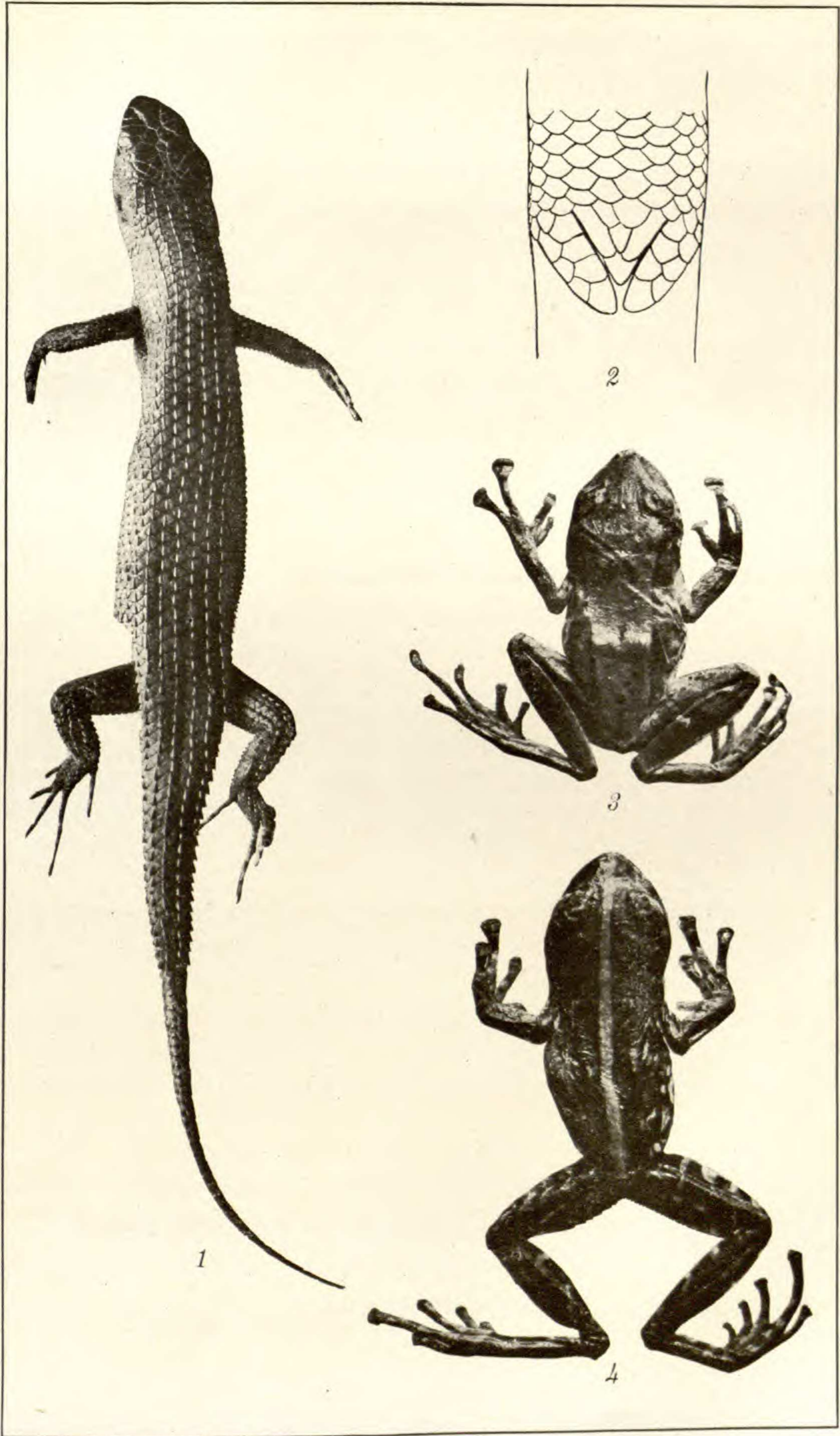


PLATE 4.